APHIDS OF THE ROCKY MOUNTAIN REGION

By
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Colorado Agricultural and Mechanical College.

THE THOMAS SAY FOUNDATION

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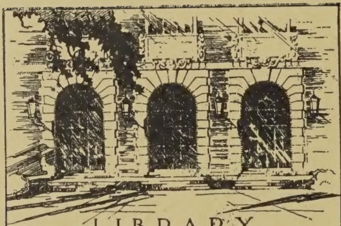

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APHIDS OF THE ROCKY MOUNTAIN REGION

Including primarily Colorado and Utah, but also a bordering area composed of southern Wyoming, southeastern Idaho and northern New Mexico.

The aphids of this region include most of the economic species known to occur in the United States or even in North America.

By

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This volume is dedicated to

GEORGE M. LIST

whose wise guidance, kindly encouragement and untiring support in administrative ways made possible the final accomplishment of this endeavor.

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INTRODUCTION

The purpose and scope of this work is to set forth as clearly as possible the taxonomic characters of the species of aphids recorded up to 1950, on both native and introduced plants in the state of Colorado and adjacent territory belonging to the same biotic areas as contained in Colorado. The region herein treated comprises the whole series of life zones beginning with the Arctic-alpine which is inhabited by practically no aphids, to, but not including, the Lower Sonoran or desert zone. Geographically, the region comprises the Southern Rocky Mountains, the Wasatch and Uintah Mountains, the Jemez and Sangre de Cristo Ranges and adjacent plains. Politically, the region comprises the entire states of Colorado and Utah, southern Wyoming, southeastern and southern central Idaho and northern New Mexico.

This work is not a revision and responsibility is not assumed as to complete synonymy. However, considerable time has been spent on comparisons with similar species as far as they have been located by the regional keys in existence and by host plant records. The host plant lists are the only published guides to a large number of species described in recent years. A comprehensive revision of the aphids of not only North America but of the world is very much needed.

A conservative attitude has been taken as to the status of species doubtfully distinct, especially in cases where only a small number of individuals and only one life cycle form have been taken. It has seemed best to hold such species distinct and await collections of larger numbers which may show intergrading variations uniting some forms into one species or the discovery of other life cycle forms which may exhibit more distinct differences, thus establishing a separate status in other cases.

Careful descriptions, life history habits and drawings, the latter by the author and of equal authority with the text, are given for each species so that it will be possible for other workers to know definitely what the species are and to give a sound basis for writing of revisions by later workers.

The plan of classification followed is mainly that of A. C. Baker (1920a). Some workers will disagree with this, and doubtless improved systems will appear or, in the opinion of some, have already appeared. However, the characters on which these latter classifications are based are less obvious than those used by Baker and require clearing of the specimens. Most of the aphids used in this study have not been thus prepared and the necessary characters cannot, at the present time, be observed in them. It would be necessary to remount and redescribe much typic material before such a system could be applied. It seems therefore more practical at this time to use a system based on characters more easily observable.

The bibliographies contain only the reference to the original description and a few later, usually fuller, descriptions aiding in establishing the concept of the species.

Type locations, as far as known to the writer, are given following the description of each species.

Acknowledgment

Acknowledgments are due to nearly all the aphidologists in the Northern Hemisphere living in this century for aid in opinions and loans or contributions of determined specimens as well as in their published works. In the latter service, of course, all the former aphidologists also deserve credit. Mention of individuals deserving special credit will be made in connection with the species concerned. To avoid too numerous repetitions special mention is here made of George F. Knowlton who very generously cooperated in every way possible, especially in the loan and contribution of all his typic material of over 100 species; practically all the Utah and Idaho records were his collections. H. C. Manis also aided in submitting a list of aphids taken in southern Idaho. D. G. Denning kindly loaned aphid material from Wyoming. F. C. Hottes supplied many of the records from western Colorado and loaned all his typic material and many other specimens.

Thanks are due to Myron Swenk for loans of specimens from the collection of University of Nebraska. A. A. Granovsky and, earlier, J. T. Monell aided by loans of specimens and valuable advice on the group Panaphini. A. C. Maxson lent much valuable assistance on the subfamily Eriosomatinae, in loan of specimens, and of data besides valuable advice. E. O. Essig kindly loaned many type specimens of species described in California and freely gave his opinions on many of the determinations. Special mention is due to E. A. Chapin, C. F. W. Muesebeck, P. W. Mason and Louise M. Russell for making possible the examination of type specimens in the United States National Museum and for advice on nomenclatorial problems as well as for kindly encouragement.

Thanks are also due to E. O. Essig and Miss L. M. Russell for reviewing the manuscript and making many valuable suggestions.

To D. Hille Ris Lambers thanks are here extended for much detailed advice on classification and identity of species and for the opportunity of examining many European species, made possible by

the loan of a number of slides and the contribution of over 200 slides of beautiful aphid mounts. N. Cholodkovsky, A. Mordvilko, P. van der Goot and J. M. Mimeur also contributed determined specimens of many European aphids.

Former staff members here deserve major credit for laying the foundation and building the structure of which this work is the culmination. Chief of these was C. P. Gillette, the founder of the project, who determined the major portion of the collection and described many new species. C. F. Baker and J. H. Cowen served as early assistants in the starting of the work. L. C. Bragg, an enthusiastic and tireless collector, made fully one-third of the collection upon which this work is based.

Former comprehensive works on aphids published by the Colorado State Agricultural Experiment Station, were first, "Hemiptera of Colorado" by Gillette and Baker, 1895, pp. 115-125, containing 60 species described by J. H. Cowen, and "The Aphidae of Colorado" by Gillette and Palmer, in three parts, published in 1931, 1932, 1934, respectively, containing 333 species.

The present work contains more than 100 additional species, thus including all which have been described from the region up to 1950. The keys have been rewritten and improved and nomenclature brought up to date as far as possible.

Family Aphidae Samouelle*

Aphides Linnaeus, 1758:452 (footnote).
Aphidae Samouelle, 1819:232.
Aphidina Burmeister, 1835:85.
Aphididae Passerini, 1863.
Aphiidae Baker, 1921:101.

CHARACTERS

Baker 1920a:2.

Aphids are parasitic on plants, sap sucking and usually living in colonies. Sizes 1-5 mm; soft bodied and relatively slow moving. Adults are both alate and apterous, the antenna is four to six, usually six, segmented, the first two segments very short and the last segment bearing a flagellumlike prolongation or unguis varying from a mere spur to a long filament; wing venation typically as shown in figure 1, but media of fore wing may be once-branched or simple. Tarsi two-segmented, the first very short, the second bearing two claws; cornicles are nearly always present, varying from mere pores to long tubes on the fifth or sixth abdominal segment; cauda present as a projection from the tip of the abdomen, varying from inconspicuous, rounded, half-moon-shape or short-tapering or knobbed to elongate-tapering or spatulate. The latter two organs are peculiar to this family.

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*This usage is in conformity with Opinion 143 rendered by the International Commission on Zoological Nomenclature in 1943, and with the recommendations of said Commission as set forth in The Bulletin of Zoological Nomenclature, volume 4, parts 7-9, p. 246, 1950. This principle as applied to sub-families, tribes, and subtribes results in the changing of names formerly ending in aphidinae, aphidini and aphidina to aphinae, aphini, and aphina, and several such modifications are proposed in this paper.

LIFE CYCLE

The life cycle (Fig. 1) is quite characteristic of a type known as heterogamy or cyclic reproduction. There occurs an alternation of asexual generations with a sexual generation. The typical life cycle forms are as follows:

Stem Mother or Fundatrix is the form hatching in the spring from the over-wintering egg and reproducing parthenogenetically (without mating with a male) and viviparously (bringing forth the young alive).

*Summer Viviparae** consist of apterous (wingless) and alate (winged) summer viviparous females, or viviparae, also called agamic females, and develop from the young produced by the stem mother and by succeeding generations throughout the summer. They reproduce in the same way as the stem mother. The individuals born from the fundatrix are called fundatrigeniae.

Sexuparae, either apterous or alate viviparae, typically develop in the last generation of the summer viviparae and appear in late summer or fall. They reproduce in the same manner as their parents but their young develop into the sexuales.

Sexuales typically appear in the last generation of the cycle and consist of the true female, usually apterous, and the male, either alate or apterous. This female is called an oviparous female or ovipara because she lays eggs instead of bringing forth her young alive. She is also called *gamic* because she mates with the male.

Eggs remain dormant on the plant where they were laid until spring when they hatch into the fundatrices thus completing the cycle.

LIFE HISTORY

The life history is also very characteristic but varies greatly with the different species. Most species are very restricted as to host plants. Many feed on only one species of plant. Others accept related plants and a relatively small number have a primary or winter host, a perennial, usually woody plant, and one or more

---

*Occasionally adult wingless individuals show abortive wing pads or on the venter of the thorax show indications of the sutures of the alate thorax. Such an individual is called an *intermediate* or *alatiform female.* This form may show some antennal characters of the alate form such as increased number of sensoria. The nymph of the alate form in the later instars when the wing pads appear is often called a *pupa* but more properly perhaps an *alatoid nymph.* A *dimorph* is an immature aestivating form which occurs in certain genera. The individual remains small, in a state of arrested growth for several weeks; is usually flattened and often bearing flabellate hairs on the vertex and along the lateral margins of the body. It later resumes growth, attains maturity as a normal vivipara called a *dimolt,* (Davis, 1908b:130) and reproduces either viviparae or oviparae.

secondary or summer hosts, usually annuals or herbaceous plants. On the primary host the winter is passed in the egg, consequently here also occur the fundatrix and one or more ensuing generations until the population consists of only alate viviparae which act as spring migrants and fly away to the summer or secondary hosts. Here successive generations are produced till the sexuparae, fall migrants, appear and, in many cases, alate males, both of which fly back to the primary hosts. The oviparous females are deposited here, mature and, after mating, lay the over-wintering eggs and die.

However, many variations and exceptions occur. Scattered individuals may remain on the primary host all summer and the same may occur on the secondary host over the winter if the plant concerned is a perennial or is protected, as in a greenhouse. Indeed in the latter situation and in warm climates the sexual part of the cycle may be entirely omitted.

ECONOMIC IMPORTANCE

The economic importance of aphids is a matter of major concern. Aphids constitute one of the most injurious insect groups. Their attacks on plants cause serious damage in three ways: (1) By robbing the plant of sap, (2) by toxic action of their salivary secretions, injected during feeding, thus causing stunting of growth, deformation of leaves and even of fruit or causing galls on leaves, stems or roots, and (3) by acting as vectors of viruses which cause many diseases of plants. Since aphids are usually specific both as to plants attacked and as to plant viruses carried in the capacity of vectors their taxonomy is highly important.

COLLECTING AND SHIPPING

Adult aphids, especially winged ones, are essential for identification and since the colonies usually consist predominately of immature individuals, the mature ones often leaving soon after the last molt to establish other colonies, it is highly desirable to preserve the aphids alive and in confinement for a day or two after capture in order to allow more individuals to mature. The aphid colony, together with the part of the plant to which they are attached, may be enclosed in a vial or a tight tin box, without holes, so as to prevent drying of the plant. The end of the stem should be caught with the cork or lid. The box or vial should be lined with paper to absorb moisture thus preventing formation of droplets which would entangle and damage the aphids. First of all, examination must be made to eliminate any enemies, which would destroy the aphids. They may be kept thus for several days or even a week in a cool place and a greatly increased number of adults will result. They may even be shipped in this sort of container if sufficient packing of paper is inserted to prevent bumping about of the piece of plant and resulting damage to the aphids. If the journey is longer than two or three days this method is not advisable and the entire specimen should simply be put into a vial with 70% alcohol or rubbing alcohol or better still the adult aphids may be picked off with a fine brush and put into the alcohol.

The preferred method of preparation if a considerable number of specimens are to be sent to a specialist for determination is to have the aphids mounted on slides. Directions for mounting aphids may be found in a paper by E. O. Essig (1948:9).

The aphids may be mailed to any State Agricultural Experiment Station or to an aphidologist.

ABBREVIATIONS

When abbreviations are used in any of the figures showing aphid structures, they are used as follows:

Al.	Alate or summer alata
Ant.	Antenna
A.P.	Anal plate
Apt.	Apterous or summer aptera
Ca.	Cauda
Co.	Cornicle
E.	Eye
Fund.	Fundatrix or stem mother
Gon.	Gonopophyses
Ovip.	Oviparous or ovipara
R.	Rostrum*
S.	Stigma
Hd. Ta.	Hind tarsus
Hd. Ti.	Hind tibia
T.S.	Tibial spines or hairs on dorsal side of middle of hind tibia
U.	Unguis of antennal VI
Ver.	Vertex
Viv.	Viviparous female or vivipara
I, II, etc.	(if not otherwise designated) Antennal segments of corresponding number
♂	Male
♀	Gamic or oviparous female or ovipara

*The rostrum is here considered to be five-segmented following the terminology of Mordvilko (1914:79). The tip or terminal segment is accordingly segment V, the preceding tapering segment is segment IV, and the preceding thicker or broader segment is segment III. In most groups of aphids segments IV and V are fused and this portion of the rostrum is designated as rostral IV+V.

Figure 1

Aphid external anatomy and life cycle forms illustrating terms used in this work. Using as illustration subfamily Aphinae. Life cycle figures (X15) are *Aphis helianthi* Monell except apterous male which is *Aphis rociadae* Cockerell.

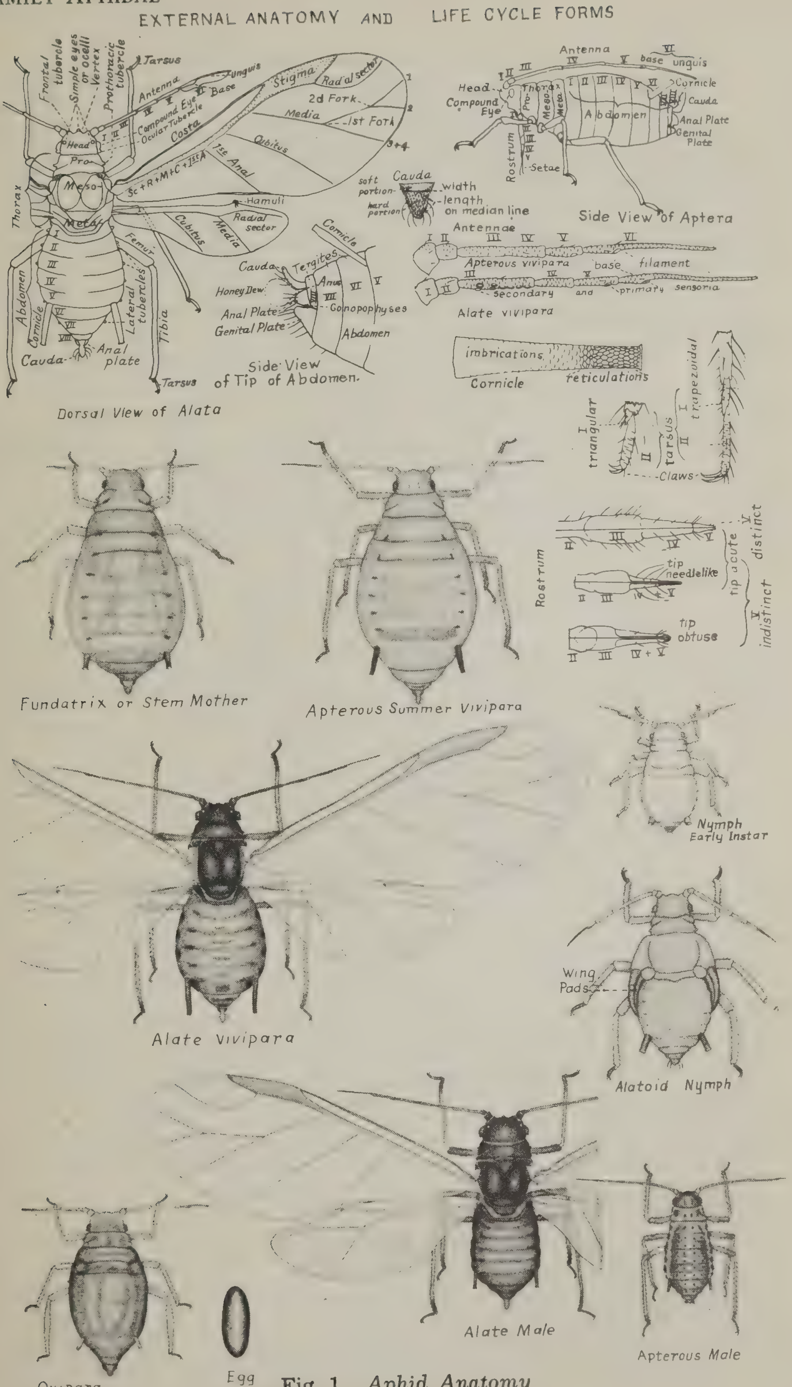

Fig. 1. *Aphid Anatomy*

EXPLANATIONS

Quotation marks enclose data quoted from the original description which were not verified in typic material studied by the author of this work, but might exist in other cotypes or paratypes observed by the author of the species. Measurements are given in millimeters. Body length is taken from vertex to base of cauda. Base of antennal VI is here considered to extend to the base of the unguis, thus to include the entire permanent sensorium (except in *Essigella*).

Descriptions of color refer to the dorsum only, unless otherwise stated. Antennal segment measurements are given in limits of variation not in exact proportions of any certain individuals since only inside the limits of variation do proportions hold true. This may be observed by study of tables of measurements. Frequently the longest limit of one segment may be found in the same antenna with the shortest limit of another segment (Bachelder 1927:263). Hairs on hind tibia refer to those on the dorsal side in the middle region. Measurement of cauda is made on median line, hard portion, unless listed for side.

Collection dates are more or less accidental findings; little intensive work on limits of occurrences has been done. Keys are constructed as far as possible on characters applying to both alate and apterous viviparae unless otherwise stated, designated as alata and aptera respectively.

TAXONOMY

Key to Subfamilies of Aphidae

1. Antenna, cauda or cornicle or all three well developed; wing veins not reduced, media once or twice-branched (Fig. 1); sensoria on antenna circular or oval; wax glands not abundant, rarely present. Living naked and exposed on plants, sometimes in curled leaves, rarely on roots. (p. 8) .... *Aphinae*

.... Antenna more or less short, especially in aptera; cauda inconspicuous and cornicle a mere pore or wanting; wing veins reduced, media only once-branched or simple. (Fig. 421 and 436); sensoria on antenna usually transverse or annular (Fig. 421 and 449), rarely circular; wax glands often abundant. Living concealed under flocculent secretions, in folded leaves, in galls or underground on roots (except *Mindarus*) 2

2. Radial sector arising at proximal end of stigma; cauda somewhat produced, not knobbed. Living exposed. (p. 346) .... *Mindarinae*

.... Radial sector arising from stigma, usually near distal end (Fig. 421); cauda either semilunar (Fig. 421) or knobbed (Fig. 455). Living usually concealed under flocculent secretions, in folded leaves, in galls or on roots; wax glands usually numerous 3

3. Sexuales without functioning mouth parts; ovipara laying a single egg; cauda semilunar; anal plate entire. Aleyrodiform stages not developed (p. 347) .... *Eriosomatinae*

.... Sexuales with functioning mouth parts; ovipara laying several eggs; cauda knobbed; anal plate bilobed. Aleyrodiform stages common (p. 376) .... *Hormaphinae*

Subfamily **Aphinae** Gillette and Palmer

Gillette and Palmer, 1931:830.

Characters. Cornicle evident, either as a cylindrical or clavate tube or as a raised rim, usually on mammiform base, rarely absent; cauda usually well developed (except in Lachnini and Chaitophorini in part, in Phyllaphina and in *Amphicercidus*). Compound eye developed in aptera; antenna always longer than head and thorax, sometimes longer than body. Living exposed on plants, occasionally in curled leaves or underground on roots.

Key to tribes of Aphinae

1. Cornicle mere rim, usually on broad shallow cone, mammiform, or rarely, rim placed directly on body; radial sector straight or curved 2
.... Cornicle truncate or more or less elongate, rarely mere pore (in *Thripsaphis* and *Monellia*) or absent (in Fullawayina); radial sector never straight.......... 4
2. Cauda knobbed 5
.... Cauda not knobbed 3
3. Cornicle and antenna hairy (except in *Essigella*); radial sector straight (except in *Lachnus*, Tramina and Anoecina); hind wing normal; unguis thick, much shorter than base of VI (except in *Longistigma*) (p. 9).......... *Lachnini*
.... Cornicle and antenna not noticeably hairy; radial sector curved; hind wing reduced; unguis slender nearly as long as base of VI (p. 112).......... *Setaphini*
.... As above except unguis much longer than base of VI and hind wing normal (p. 59) .... *Phyllaphina*
4. Cornicle usually truncate, rarely elongate and rarely mere ring or pore or absent; cauda usually knobbed, anal plate indented or bilobed; when cornicle elongate cauda always knobbed and anal plate indented or bilobed or large hairy forms with cauda semilunar and anal plate entire. Gonopophyses 2 or 4. (p. 59).......... *Panaphini*
.... Cornicle not truncate, usually elongate, rarely absent; cauda never knobbed, usually elongate, rarely semilunar; anal plate entire; not large hairy forms. Gonopophyses 3. (p. 112) .... *Aphini*
5. Anal plate entire. (p. 57) .... *Thelaxini*
.... Anal plate divided. (p. 79) .... *Saltusaphina* in *Panaphini*

Tribe **Lachnini** Wilson

Wilson, 1911b:51.

Characters. Frontal tubercles lacking; antenna and body usually hairy; secondary sensoria circular; unguis much shorter than base of VI, or if not, stigma greatly elongated; stigma usually more or less elongate and radial sector straight (except Anoecina and Lachnina in part); cornicle mere rim, usually on broad hairy cone, rarely mere pore or not evident (in Tramina and Eulachnina); cauda always broader than long, appearing semilunar and rounded but really ending in upturned point; anal plate rounded, entire.

Key to Subtribes of Lachnini

1. Hind tarsal I triangular, hardly longer than wide; radial sector not straight.......... 2
.... Hind tarsal I trapezoidal, longer than wide; radial sector straight (except in *Lachnus*) 3
2. Hind tarsal II never exceeding third of length of hind tibia, tarsal I normal size; cornicle mammiform (p. 9) .... *Anoecina*
.... Hind tarsal II half or more of length of tibia, tarsal I minute; cornicle mere ring or absent (p. 56) .... *Tramina*
3. Rostrum obtuse, with V vestigial and may appear coalesced.......... 4
.... Rostrum lancelike, V well developed and distinct (p. 20) .... *Cinarina*
4. Radial sector straight; cornicle reduced to mere ring or small cone, with few or no hairs. Feeding on needles of Coniferae (p. 13) .... *Eulachnina*
.... Radial sector more or less curved (except in *Longistigma* where stigma is elongated to reach apex of wing); cornicle hairy cone. Feeding on nonconifers, on leaves, twigs or bark (p. 52) .... *Lachnina*

Subtribe **Anoecina** Baker

Baker, 1920a:13.

Characters. Antenna six-segmented, with long hairs and protruding subcircular or oval sensoria. Fore wing with stigma short and broad; radial sector curved, arising some distance proximally to tip of stigma; media once-branched, not faint. Tarsi short and thick, Aphislike; tarsal I triangular in lateral view. Cornicle on shallow hairy cone. Rostrum with segment V indistinct, i.e., fused with IV. Cauda semilunar. Gonopophyses none.*

*According to van der Goot (1915:507).

This group is placed under the Pemphiginae by some authorities, but the rather mammiform cornicle, the conspicuous hairiness, the absence of wax glands and the possession of functional mouth parts by the sexuales seem to the writer to definitely separate it from Pemphiginae and ally it to the Lachnini. The rounded cauda and anal plate agree with both groups. The protruding, sometimes elongate-oval sensoria and the lack of gonopophyses agree with Pemphigini; but these characters seem less definite than those which disagree with this group.

Only one genus represented in region.

Genus **Anoecia** Koch

Koch 1856:275; Baker, 1920a:13.

Characters. Same as for subtribe also unguis much shorter than base of VI; hind wing with two cross-veins; cauda rounded, broader than long; anal plate entire. Sexuales apterous, with beaks and feeding; ovipara laying one to four or more eggs. Spring forms living exposed above ground, summer forms usually on roots.

Genotype (monotypical), *Anoecia corni* (Fabricius).

Key to Species of Anoecia

1. Sensoria narrow-elongate, 6-19 on III of alata; summer aptera with III .30 long (p. 10) .... *corni*
.... Sensoria oval, 0-8 on III of alata; summer aptera with III shorter than .30 long........ 2
2. Sensoria in alata nearly always large and uniform; III in summer aptera shorter than .15 (p. 12) .... *querci*
.... Sensoria in alata rarely large; III in summer aptera longer than .15........ 3
3. Unguis slender and fingerlike; aptera black (p. 11) .... *graminis*
.... Unguis stout, rather conical; aptera yellow, usually with dusky markings........ 4
4. Hairs bent near base so as to stand parallel to body (p. 11)........ *oenotherae*
.... Hairs straight or somewhat curved, not bent (p. 13) .... *setariae*

[Genotype *Anoecia corni* (Fabricius)]

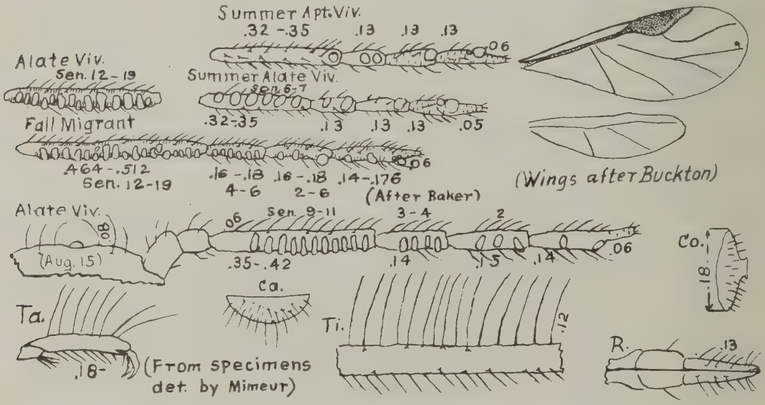

Fig. 2. *Anoecia corni*

Aphis corni Fabricius, 1775:736.
Anoecia corni Koch, 1856:275; Theobald, 1929:83; Baker, 1916e:359; Mordvilko, 1935:281.

Apterous Vivipara. Brown to black; appendages black. Body length 2-2.3.

Alate Vivipara. Head and thorax black; abdominal segments pale green, with black crossbands on posterior segments; appendages dark. Measurements of spring and summer form same as aptera. Fall migrant with antenna longer and secondary sensoria oval to narrow-transverse; early summer migrant with sensoria oval. Hairs pointed and long. Rostrum attaining 3d coxa.

Male. Apterous.

Hosts. Cornus sp., on leaves and twigs; and on Gramineae, on roots, also in ants' nests. (Not recorded from region.) Data for above description and drawings from Baker, Koch and Theobald (op. cit.).

Anoecia graminis Gillette and Palmer

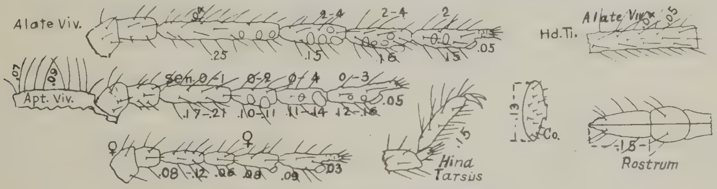

Fig. 3. *Anoecia graminis*

Anoecia graminis Gillette and Palmer, 1924:3 and 1931: 833; Mordvilko, 1935:298.

Apterous Summer Vivipara. Dull black with dusky bands; with slight pulverulence; appendages dark. Body length 2, width 1.25; hind tibia .60-.80; antenna .65-.80; rostrum attaining 3d coxa. Hairs on body simple or occasionally flattened to capitate at tip, .05-.06 long; on hind tibia simple, about same length as diameter of tibia. A circular structure resembling cornicle opening appears on lateral portion of all abdominal segments except V, VI and VIII.

Alate Vivipara. Same size as aptera or slightly larger in all parts. Secondary sensoria protruding, oval; unguis slender and fingerlike. Hairs on hind tibia about as long as diameter of tibia. Rostrum rather broad, barely attaining 3d coxa.

Ovipara. Mounted specimens appear similar in color to apterous vivipara. Body length 1.8, width .90-1; antenna .45-.57; hind tibia .40-.50, not swollen and without evident sensoria, but two eggs visible in the bodies of partially cleared specimens.

Collections. On *Hordeum* sp., on roots. Colorado: Fort Collins and Cherokee Park. Apterous summer viviparae Sept. 6 to 24, alate viviparae Sept. 13, oviparae Sept. 6, 16, and 24; rare.

Type. U.S.N.M., No. 41950. Paratypes, Colo. Agr. Exp. Sta. Collection and Mordvilko Collection in Zoological Institute, Leningrade, U.S.S.R.

This species differs from *A. querci* as follows: Relative lengths and sensoriation of the antennal segments (IV over half length of III, sensoria not uniform), more slender unguis, dark color of the aptera, lack of dorsal dark patch on fall alata and presence of ovipara on grass roots.

Anoecia oenotherae Wilson

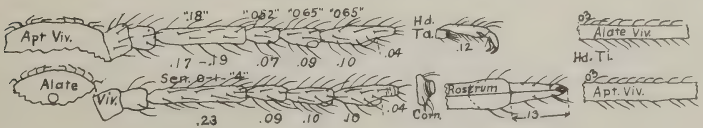

Fig. 4. *Anoecia oenotherae*

Anoecia oenotherae Wilson 1911a:63; Hottes and Frison 1931a:151-2; Palmer 1936b: 730.

Apterous Summer Vivipara. Body "Yellow with 3 or 4 dorsal stripes"*; appendages dusky. Body length 1.5; antenna about .50; hind tibia .53; rostrum attaining between abdominal I and II. Hairs on vertex, side of abdomen and cornicle bent near base so as to stand parallel with surface, similar to simple hairs of *Geoica*.

Alate Vivipara. "Yellowish green with 5 dorsal stripes* and lateral areas." (Mounted on slides), head and thorax black, also cornicle and appendages. Body length 1.4; antenna about .65; hind tibia .60; other measurements as in apterous vivipara. Sensoria on III 0-"3-4". (Two of the cotypes each show one III without sensoria.)

Collections. On root of *Oenothera* sp. and on *Setaria glauca.* Colorado: Ault, Fort Collins and Cherokee Park. Alate and apterous viviparae Aug. 5 to Sept. 10; rare.

Cotypes. U.S.N.M. or Granovsky and Colo. Agr. Exp. Sta. Collections.

Chief Distinguishing Characters. Bent hairs, pale body and length of III in aptera (2.6 times IV).

Anoecia querci (Fitch)

The White-banded Dogwood Aphid

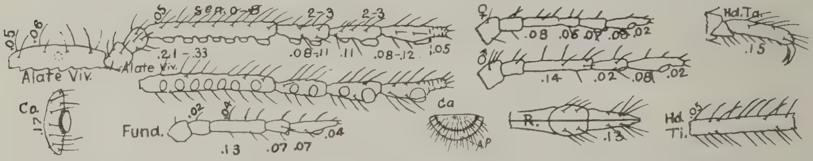

Fig. 5. *Anoecia querci*

Eriosoma querci Fitch, 1859:804.
Eriosoma cornicola Walsh, 1862:304.
Anoecia querci, Baker, 1916e:359; Cutright, 1925:187; Hottes and Frison, 1931a:152; Gillette and Palmer, 1931:833.

Fundatrix. Body length 1; hind tibia .34; hind tarsal II .10; antenna .45, III and IV fused; rostral IV+V .11, attaining abdomen; cornicle .10 in diameter at base of cone. Hairs rather stout, .04-.06 long on vertex and body, on hind tibia, .02-.04 and sparse. Eye composed of three facets.

*Apterous Summer Vivipara.*** Body "whitish or yellowish with crossbands and covered with powder. Body length 1.7; antennal III .13, IV .06, V .08, VI .096+.048".

Alate Vivipara. Pale greenish or whitish to reddish brown with black crossbands and large quadrate dorsal patch on abdominal III to VII in late summer and fall alate viviparae but not on spring migrants; appendages and rostrum black. Body 2-2.5; hind tibia .7-1; antenna .9-1, unguis stout and club-shaped; secondary sensoria varying greatly in size, oval almost circular; rostrum attaining 3d coxa. Hairs rather stout, numerous, slightly curved. Fore wing with media once-branched.

Ovipara. Apterous. Sordid yellow shading to brownish anteriorly, tinged with reddish brown on abdomen; appendages sordid yellowish. Body length 1.20; antenna .35-.40, IV sometimes fused with III; hind tibia .27-.30, not swollen or showing sensoria. Some examples showing egg, .60 by .37, inside body.

Male. Apterous. Sordid yellow shading to dusky on head, dark reddish brown on abdomen; appendages dusky, lighter on antennal III and proximal half of tibiae. Body length .60-.70; antenna .35-.40, no secondary sensoria evident; hind tibia .24; rostral IV+V .07, attaining 3d coxa.

Collections. Quercus (migrants, accidental). On *Cornus stolonifera,* on leaves and stems as winter host, and roots of grasses as summer host; from this region only on *Cornus stolonifera.* Colorado: Fort Collins, Delta, Paonia, Palisade and Cherokee Park. Utah: Generally, especially in northern half of state. Fundatrices April 25, apterous summer viviparae not taken, alate viviparae Aug. 27 to Oct. 31, sexuparae Oct. 1 to 22; common.

Cotypes. U.S.N.M.

This species has not been recorded here on its summer host, the grasses. This fact would seem to throw suspicion on the validity of the two species of *Anoecia,* namely *setariae* and *graminis* taken from grasses, suggesting them as

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*Evidently meaning crossbands.
**From description by Baker (op. cit.).

possibly being the summer form of *querci*. The characters of these grass species seem, however, to be distinct as set forth under the respective species. These three forms are accordingly held separate until further investigation proves otherwise.

From *A. corni* this species is separated by the following characters: Round sensoria (not narrow-elongate), smaller number of sensoria (not more than 8) on III of alata and shorter antenna (III in aptera ".13", not .32-.35; in alata .20-.33, not .46-.50).

Anoecia setariae Gillette and Palmer

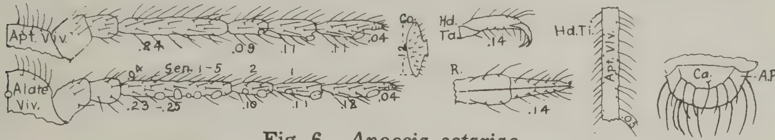

Fig. 6. *Anoecia setariae*

Anoecia setariae Gillette and Palmer, 1924:4 and 1931:834; Mordvilko 1935:296 (erroneously as synonym of *A. cornicola* Walsh).

Apterous Summer Vivipara. Pale orange-yellow, tinged with brownish on head; with slightly dusky dashes on dorsum of abdominal IV to VII inclusive and lateral areas on all; cornicle and appendages pale yellowish, dusky on tips of tibiae and entire tarsi. Body length 1.9; antenna .60-.65; hind tibia .55-.60; rostrum attaining abdominal I. Hairs on body pointed, fine and often bent posteriorly near base.

Alate Vivipara. Head and thorax black; abdomen pale green with slightly dusky dorsal dashes on all segments; cornicle and appendages pale. Body length 1.9; hind tibia .70; antenna .70.

Collections. On roots of *Setaria* sp. and *Echinochloa crusgalli.* Idaho: Rexburg. Colorado: Fort Collins. Apterous viviparae Aug. 12 to Sept. 21; alate viviparae July 21 to Sept. 21; rather rare.

Type. U.S.N.M., No. 41951.

Chief Distinguishing Characters. Hairs straight (not bent), body pale with dark dorsal patch absent on fall migrants, length of III in summer aptera (about .24), and length of unguis (third of base of VI).

Subtribe **Eulachnina** Baker

Baker, 1920a:13.

Characters. Body narrow and elongate, hardly broader than head. Eyes prominent, lacking tubercles. Hind tarsal I elongate, dorsal side over half as long as ventral side. Cauda rounded; cornicle shallow, not on hairy cone. Rostrum obtuse; segment V reduced to mere tip. Stigma elongate; radial sector straight, arising at lower distal angle of stigma. Living on needles of Coniferae.

Key to Genera of Eulachnina

1. Antenna six-segmented, bearing hairs or spines 2
.... Antenna five-segmented bearing minute bristles or naked (p. 13) .... *Essigella*
2. Cornicle mere ring. Hind tarsal I with dorsal hairs (p. 16) .... *Eulachnus*
.... Cornicle small cone with few or no hairs. Hind tarsal I dorsally without noticeable hairs (p. 18) .... *Schizolachnus*

Genus **Essigella** Del Guercio

Del Guercio 1909a:329 and 1909b:74; Baker, 1920a:14.

Characters. Body elongate and narrow, parallel-sided. Head much broader than long, eye prominent, ocular tubercle absent. Antenna of five segments (III and IV coalesced) bearing only a few minute bristles; unguis bearing primary sensorium. Fore wing with media faint, once-branched or simple. Rostrum broadly obtuse, segment V reduced to mere tip. Cornicle mere ring,

not on hairy cone. Cauda rounded to pointed. Tarsal I trapezoidal, bearing dorsal hairs; claws bifurcate. Living on needles of pines, especially between needles at bases; very quick and active.
Genotype (monotypical), *Lachnus californicus* Essig.

Key to Species of Essigella

1.	Tibial hairs not longer than half of diameter of tibia (p. 15)	*hoerneri*
....	Tibial hairs not shorter than diameter of tibia	2
2.	Tibial hairs about same length as diameter of tibia (p. 16)	*pini*
....	Tibial hairs much longer than diameter of tibia	3
3.	Tibial hairs 1.5-2 times as long as diameter of tibia (p. 14)	*fusca*
....	Tibial hairs distinctly longer than twice diameter of tibia (p. 14)	*californica*

Essigella californica (Essig)

The Monterey Pine Aphid

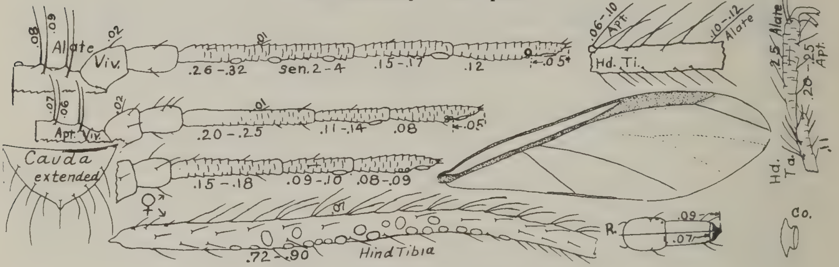

Fig. 7. *Essigella californica*

Lachnus californicus Essig, 1909a:1.
Essigella californica, Essig, 1912b:780; Gillette and Palmer 1931:838.

Apterous Summer Vivipara. Pale green to yellowish, speckled with dusky at bases of hairs; with slight pulverulence; appendages pale brownish or slightly dusky, especially distally. Body 2 by .6; hind tibia 1.2; antenna .60-.66. Cornicle mere rim without mammiform base. Cauda semilunar. Hairs simple, on hind tibia 2-3 times as long as diameter of tibia.

Alate Vivipara. Body 2-2.2 by .50; hind tibia 1.3-1.9; antenna, .80, III and IV coalesced, secondary sensoria large, convex, not tuberculate. First and second pairs of tibiae much shorter than hind pair. Hairs pointed, on hind tibia spinelike, 3-4 times as long as diameter of tibia; on body short and sparse. Rostrum obtuse, attaining 3d coxa. Fore wing with media once-branched.

Ovipara. Apterous. Body length 1.2-1.3; antenna .45-.50; hind tibia .60-.90, slightly swollen on proximal half and bearing large and small sensoria along ventral side. Otherwise as in apterous vivipara.

Collections. On *Pinus contorta* var. *murrayana,* rarely *P. ponderosa* var. *scopulorum,* in tender tips on needles, near bases; solitary. Colorado: Hills above Bellvue. Utah: Logan. Fundatrices May 24, apterous summer viviparae June 6 to 14 and Oct. 9, alate viviparae June 16 to Oct. 9, oviparae Oct. 2 to 9; seemingly rare.

Type. Essig Collection, No. 47.

Chief Distinguishing Characters. Long hairs on hind tibia (length of hairs 3-4 times the diameter of the tibia) and long antenna (in aptera III .20-.25).

Essigella fusca Gillette and Palmer

The Brown and Green Pine Needle Aphid

Esigella fusca Gillette and Palmer, 1924:6 and 1931:839.

Apterous Summer Vivipara. Head and often pronotum dusky yellowish brown; thorax dusky brown; abdomen pale to medium greenish or glaucous green, with dorsum marked with dusky spots often coalesced into crossbands or one solid patch fading out on head and pronotum; legs mostly dusky to blackish; antenna pale yellowish, dusky distal to middle of III. Body length 2-2.2, width .5-.8 parallel-sided; hind tibia .80-1.15: antenna .45-.55, unguis cylindrical, blunt, bearing primary sensorium. Hairs slightly capitate; on hind tibia at angle of 45-60 degrees, 1.5 times as long as diameter of tibia.

Alate Vivipara. Head and thorax brown; abdomen medium green with dusky dots coalesced into broken crossbands; antenna dusky brown; all tibiae and tarsi black. Body 1.7 by .75; hind tibia 1.05-1.3; antenna .57. Otherwise same as apterous vivipara except hairs on hind tibia about twice as long as diameter of tibia. Fore wing with media usually once-branched, rarely simple. Rostrum attaining the 3d coxa or abdomen.

Ovipara. Apterous. Yellowish dusky green becoming yellowish brown on head and prothorax and with numerous small fuscous spots at bases of hairs; tibiae, tarsi and tip of antenna blackish. Body 1.7 by .50; antenna as in apterous vivipara; hind tibia .72-.80, hardly swollen but bearing large sensoria along posterior border.

Male. Apterous. Dusky or olive-green posteriorly, shading to light rusty brown on thorax and head; appendages rusty brown to dusky.

Egg. Shining black a few days after being laid; placed lengthwise on upperside of needle.

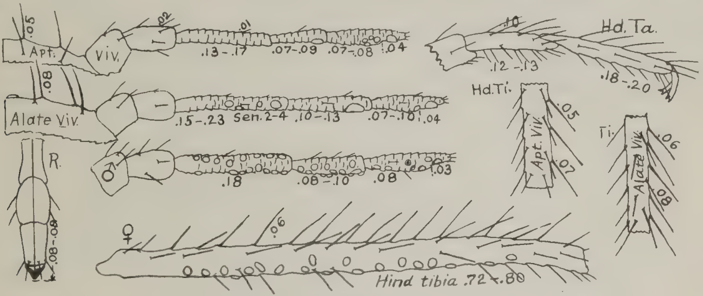

Fig. 8. *Essigella fusca*

Collections. On *Pinus ponderosa* var. *scopulorum,* on bases of needles. Colorado: Estes Park, Pingree Park, Bellvue, Log Cabin, Fort Collins, Denver and South Saint Vrain Canyon. Utah: Kanab, Beaver Canyon and Logan Canyon. Wyoming: Heron Creek. Fundatrices May 8, apterous summer viviparae July 12 to Oct. 21, alate viviparae June 19 to Oct. 7; sexuales Sept. 11 to Oct. 21; common but difficult to find on account of secluded location among needles, protective coloration and agility in escaping.

Type. U.S.N.M., No. 41953. Paratypes, Colo. Agr. Exp. Sta. and Hille Ris Lambers Collections.

Chief Distinguishing Characters. Dusky dorsal color in aptera, usually once-branched media of fore wing and length of tibial hairs (1.5-2 times diameter of tibia).

Essigella hoerneri Gillette and Palmer

The Immaculate Green Pine Needle Aphid

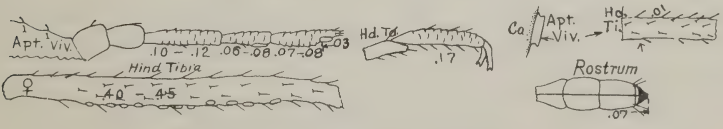

Fig. 9. *Essigella hoerneri*

Essigella hoerneri Gillette and Palmer, 1924:5 and 1931:840.

Apterous Summer Vivipara. Head and prothorax brownish; abdomen apple-green posteriorly to yellowish anteriorly, without dusky spots at bases of hairs; legs pale; antenna pale proximally, dusky distally. Body 1.4 by .5; hind tibia .55-.65; antenna .42. Hairs slightly capitate, sparse; almost invisible on antenna, vertex and body except posteriorly on the latter where they are pointed and .05 long. First and second pairs of femora somewhat thickened. Rostrum obtuse, attaining between 3d coxa and middle of abdomen.

Ovipara. Apterous. Same color as apterous vivipara except slightly dusky on abdomen and appendages. Body 1.40; antenna .35; hind tibia very slightly swollen, bearing sensoria along posterior side. Many showing 2 ova inside of body.

Egg. Black, naked. Size .86 by .33.

Collections. On *Pinus edulis* in abundance, rarely on *ponderosa* var. *scopulorum* and *P. flexilis,* on needles especially at bases; solitary. Colorado: Near Cameron Pass, Owl Canyon (in Larimer County). Utah: Logan Canyon. Apterous summer viviparae Aug. 24 to Nov. 8, oviparae Oct. 27 to Nov. 6; abundant but difficult to find on account of secluded habitat, solitary habits, small size, protective color and agility in escaping.

Type. U.S.N.M., No. 41952. Paratypes, Colo. Agr. Exp. Sta. and Essig Collections.

Chief Distinguishing Characters. Shortness of the tibial hairs (.01, much shorter than diameter of tibia) and absence of dusky spots on dorsum of body.

Essigella pini Wilson

The Speckled Pine Needle Aphid

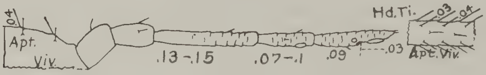

Fig. 10. *Essigella pini*

Essigella pini Wilson 1919a:2; Knowlton 1930:158; Gillette and Palmer 1931:841.

Apterous Summer Vivipara. Pale greenish yellow, with rows of dusky spots on dorsum; appendages yellow with dark tips; tarsi blackish. Body 1.5-2 by .45; hind tibia .70-.95; hind tarsal II .17-.20; antenna .45-.50. Hairs slightly capitate; on hind tibia, set at angle of 30 degrees, length equal to diameter of tibia; on vertex same as on tibia. Rostral IV+V .07-.08, attaining abdomen.

Ovipara. Apterous. Same as apterous vivipara except hind tibia which bears large round sensoria along ventral side.

Collections. On *Pinus ponderosa* var. *scopulorum,* rarely *P. contorta* var. *murrayana,* on bases of needles in tips of twigs. Colorado: Foothills near Fort Collins, Bellvue, Gould, Cameron Pass and Poudre Canyon. Utah: Marysvale and Logan Canyon. Fundatrix May 24, apterous summer viviparae May 8 to Sept. 17, oviparae Aug. 20 to Oct. 13; rare.

Type. Granovsky Collection.

Chief Distinguishing Character. The length of the tibial hairs (about same length as diameter of tibia).

Genus *Eulachnus* Del Guercio

Del Guercio, 1909:327; Baker, 1920a:15.

Characters. As given for Eulachnina also as follows: Antenna six-segmented, primary sensorium proximad to unguis; hairs long, stout spines; fore wing with media faint, usually once-branched; claws simple. Living on needles of *Pinus* sp.

Genotype (fixed by Wilson, 1911b:54), *Lachnus agilis* Kaltenbach.

Key to Species of Eulachnus

1. Body green. On *Pinus sylvestris* (p. 16)........*agilis*
.... Body brown. On *Pinus ponderosa* var. *scopulorum* and *P. palustris* (p. 17)........*rileyi*

[Genotype *Eulachnus agilis* (Kaltenbach)]

Lachnus agilis Kaltenbach, 1843:161.
Schizolachnus agilis, Mordvilko, 1908:375.
Eulachnus agilis, van der Goot, 1915:389.

Alate Vivipara. Head greenish with brown blotches, leaving median line pale; thorax shining brown; abdomen green with dusky spots at bases of hairs; more or less mealy; antenna brown to black; legs dusky yellow; cornicle dusky; cauda green. Body 2-2.5 long; linear; ocular tubercle lacking; hind tibia 1.7-1.8; hind tarsal II .21; antenna 1.2-1.3, III .39, IV .21-.24, V .25, secondary sensoria absent. Fore wing with media faint, usually once-branched. Cornicle a mere raised ring. Rostrum obtuse, IV .07, V .015, attaining 2d coxa. Hairs long, spinelike; on vertex .08-.12; on body .02-.03; on antennal III .03-.07; on hind tibia .08-.11.

Apterous Summer Vivipara. Same as alate vivipara in color and measurements.

Collections. On tender needles of *Pinus sylvestris.* (Not recorded from region.)

Data for above description and figure taken from Kaltenbach (op. cit.) and from specimens determined by van der Goot, Hille Ris Lambers and H. L. G. Stroyan.

Theobald (1929:122) and Del Guercio (1909a:317) describe III of alate vivipara as bearing sensoria. Hille Ris Lambers states in correspondence that three species were confused in these descriptions, one of which, *Eulachnus brevipilosus* Börner possesses sensoria on III. Not figured on account of similarity to *Eulachnus rileyi* (Williams).

Eulachnus rileyi (Williams)

The Powdery Pine Needle Aphid

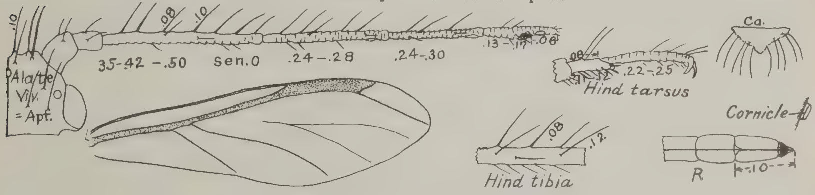

Fig. 11. *Eulachnus rileyi*

Lachnus sp. near *agilis*, Gillette, 1909c:385.
Lachnus rileyi Williams, 1910:24.
Eulachnus rileyi, Davis, 1914a:169; Knowlton, 1930:158; Gillette and Palmer, 1931:836.

Apterous Vivipara. Olive-brown; somewhat powdery; cornicle black; legs dark. Body 2-2.6 by .6; hind tibia 1.5-2; hind tarsal II .21-.25; antenna 1.2; cornicle mere ring without conical base. Cauda usually appearing rounded but with upturned tip, when extended appearing pointed.

Alate Vivipara. Same as apterous vivipara in measurements. Secondary sensoria absent in III, 1 on IV. Hairs heavy, .10 long, spinelike on vertex; sparse and inconspicuous on body; moderately numerous on appendages, on hind tibia, twice or more as long as diameter of tibia. Rostrum broad, obtuse, attaining 3d coxa. Fore wing with media faint, usually once-forked, rarely simple.

Ovipara. Apterous. Same as apterous vivipara except that hind tibia is 1.30-1.65 long with proximal half moderately swollen and rather thickly covered with flat sensoria.

Male. Alate. Same as alate vivipara except antenna which is longer, about 1.75, III .55-.65, IV .32-.37, V .35-.37, VI .17-.21+.03-.04; secondary sensoria numerous on III and IV, 12-21 on V, and 0-4 on base of VI.

Collections. On *Pinus ponderosa* var. *scopulorum* and *P. palustris,* on needles. Colorado: Denver. Utah: Salt Lake City, Plain City and Logan. Apterous and alate summer viviparae June 20 to Sept. 5, sexuales Sept. 24 to Oct. 7; rare.

Type. U.S.N.M., No. 79.

This species is very similar to *E. agilis* but is here retained as distinct on account of the following: Brown body, slightly longer antenna and hind tibia and different host. None of these characters are clearly distinctive but until further study proves them invalid it seems best to retain Williams' name.

Genus **Schizolachnus** Mordvilko

Mordvilko, 1908:375; Baker 1920a:16.

Characters. Antenna six-segmented. Rostrum with terminal segments short, tip obtuse. Ocular tubercle inconspicuous. Fore wing with media only once-branched or simple. Living on needles of Coniferae. Only one species known in region.

Genotype (fixed by Mordvilko, 1908), *Aphis tomentosa* De Geer (Syn. of *Aphis pineti* Fabricius).

Key to Species of *Schizolachnus*

1. Hind tibia slender (.065 in diameter); hind tarsal II .30-.37 (p. 18)..................*pini-radiatae*
.... Hind tibia heavy (.09 in diameter); hind tarsal II .25-.28 (p. 18)......................................*pineti*

[Genotype *Schizolachnus pineti* (Fabricius)]

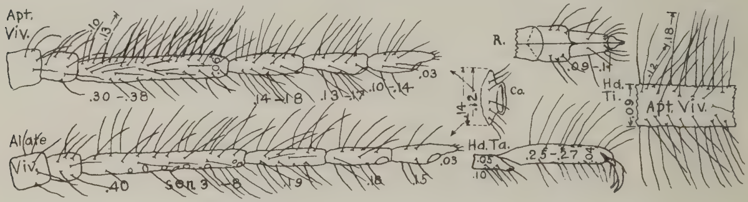

Fig. 12. *Schizolachnus pineti*

Aphis tomentosa pini de Geer, 1773:39; Del Guercio, 1909a:283.
Aphis pineti Fabricius, 1781:389 and 1794:219.
Lachnus tomentosus de Geer, Cholodkovsky, 1898:635 and 643; van der Goot, 1915:409.
Schizolachnus tomentosus, Theobald, 1929:161.
Schizolachnus pineti, Hottes, 1930b:187 (nomenclature).

Apterous Summer Vivipara. Body brown to dusky green; covered with woolly secretion also caught on legs; legs brownish; antenna distal to middle of V, rostrum, coxae, tips of tibiae, tarsi, cauda, anal plate and ventral area on abdominal VIII blackish; antenna pale to middle of V. Body length 2.2-2.7; across eyes .50; hind tibia 1.2-1.3; antenna .95-1. Rostrum attaining 3d coxa. Cornicle somewhat mammiform with shallow base which bears a few hairs. Cauda semilunar. Hairs numerous; on body and vertex .12 long. Appendages stout; antennal III .06 in diameter; hind tibia .09 at middle, thicker in proximal half; hind tarsal II .04 in diameter.

Alate Vivipara. Head and thorax black; abdomen brown to dark brown or dusky dark green; covered with woolly secretion. Dark markings same as in apterous vivipara. Body length 2.8; hind tibia 1.2-1.4; antenna about 1; secondary sensoria weak, irregular and small. Other characters as in apterous vivipara. Fore wing with media once-branched and faint.

Male. Alate. Color as in alate vivipara. Body length about 1.50; antenna 1.30, III .45, IV .28, V .27, VI .12+.03; sensorsia 20 or more on III, 8 on IV and 7 on V; hind tibia .70; hind tarsal II .22. Otherwise as in alate vivipara.

Habitat. On *Pinus sylvestris, P. mughus* and *P. pinaster,* on needles. (Not taken in region.)

Data for above description and figures obtained by study of specimens determined by Cholodkovsky, van der Goot and Hille Ris Lambers and from descriptions cited above. Color description from Cholodkovsky (op. cit.) and van der Goot (op. cit.).

Schizolachnus pini-radiatae (Davidson)

The Woolly Pine Needle Aphid

Lachnus pini-radiatae Davidson, 1909:299.
Lachnus tomentosus De Geer, (misidentification), Gillette 1917a:140.
Schizolachnus pini-radiatae, Gillette and Palmer, 1931:842.

Fundatrix. Newly Hatched. Dark olive-green with pale yellow appendages. A few hours later body is covered with a slight grayish bloom and appendages are darker and cornicle is surrounded by a dusky spot. Body length 1. *Adult.* Same as summer aptera.

Apterous Summer Vivipara. Dark olive-green to slaty-brown; thickly covered with flocculent secretion; appendages dusky with black tips. Body 2-2.5; hind tibia 1.3-1.8; antenna 1.1-1.2. Appendages slender; diameter of antennal III .03-.04, of hind tibia, .065, of hind tarsal II .03.

Alate Vivipara. Same in color and measurements as apterous vivipara.

Rostrum obtuse, attaining between 2d and 3d coxae. Hairs on hind tibia over three times as long as diameter of tibia; on antenna as long as three times diameter of III. Secondary sensoria on antenna round. Fore wing with media usually twice-forked but occasionally simple.

Ovipara. Apterous. Body length 2.3-2.7; antenna 1.3; hind tibia slightly swollen on proximal half and bearing scattered sensoria. Otherwise as in apterous vivipara.

Male. Alate. Almost black; covered with heavy flocculence; appendages, costal margin and stigma of fore wing black. Body length 2; antenna 1.50-1.57; hind tibia 1.60. Otherwise as in alate vivipara.

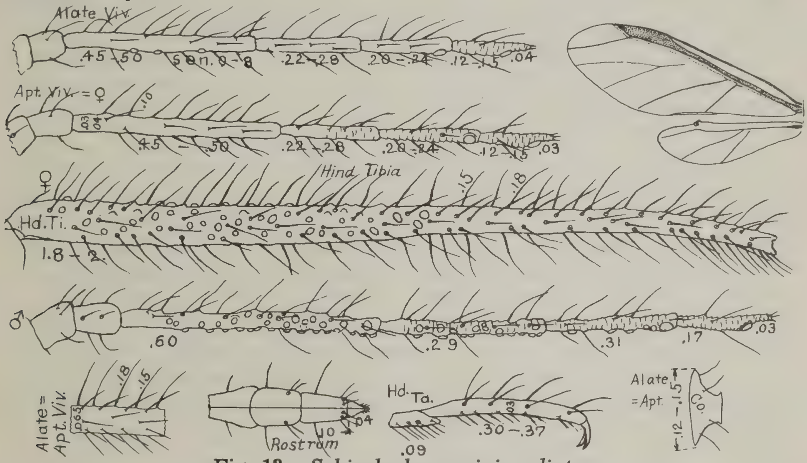

Fig. 13. *Schizolachnus pini-radiatae*

Collections. On needles of *Pinus ponderosa* var. *scopulorum* and *P. contorta* var. *murrayana*. Throughout region. Fundatrices April 7 to May 22, apterous viviparae May 28 to Oct. 2, alate viviparae May 28 to July 18, oviparae Sept. 27 to Nov. 25, males Sept. 27 to Oct. 23; common.

Type. Possibly U.S.N.M.

This form differs slightly from metatype specimens taken on *Pinus radiata* as follows: Slightly longer and stronger hairs and more numerous sensoria (3-8) on III in alate vivipara of the California examples. These differences do not seem sufficiently distinct, considering the small number of alate specimens at present available, to justify the erection of a separate species.

Subtribe **Cinarina** Börner

Börner, 1930:125.

Characters. Usually large hairy forms, brown or greenish to black, often with pattern of white secretion. Cornicle usually on hairy cone. Rostrum lancelike, segment V distinct. Hind tarsal I trapezoidal in lateral aspect, dorsal side fully half as long as ventral side. Fore wing with stigma elongate and radial sector straight reaching almost to tip of wing. Ocular tubercle usually evident. Action usually rather quick and spiderlike. Living free on Coniferae, on needles and bark of limbs and twigs.

Only one genus represented in region.

Genus **Cinara** Curtis

Cinara Curtis, 1835: sec. 576; Hottes, 1930b:185.
Lachniella Del Guercio, 1909a:286 (syn. of Lachnus, same type set).
Wilsonia Baker, 1919a:212 and 1920a:18 (preoccupied).
Dilachnus Baker, 1919a:253 and 1920a:16 (preoccupied).
Lachnus Burmeister, (misidentification), Baker, 1920a:16.
Panimerus Laing, 1925:322 (preoccupied).
Neochmosis Theobald, 1929:129.

Characters. Body usually 3-5 long, robust and bearing numerous moderate to long erect hairs; color usually brown or black, rarely green except in nymphs and often with more or less of a pattern of white powdery secretion. Antenna shorter than body, hairy, six-segmented and with unguis shorter than half of base. Cornicle mere rim usually on conelike or mammiform hairy base. Rostrum attaining abdomen or exceeding body, segments IV and V elongate and lancelike in shape, V distinct. Tarsal I elongated, distinctly trapezoidal in lateral aspect; tibiae long and hairy. Fore wing with stigma rather elongate, radial sector straight, media faint and either once or twice-forked. Living on bark of twigs and limbs of Coniferae.

Genotype (fixed by Curtis 1835: sec. 576), *Aphis pini* Linnaeus.

This genus has heretofore been designated by the writer, Baker, and others as *Lachnus* Burmeister (1835:91). *Lachnus* Burmeister is here used to replace *Pterochlorus* Rondani. This change of concept was necessitated by the facts set forth by Schumacher (1921a:185) who states that the first type-setting for *Lachnus, Aphis roboris* L. by Westwood (formerly considered invalid because the name *Aphis roboris* did not appear in Burmeister's list of included species) is validated by the statement by Burmeister (1835:1006) that his *L. fasciatus* is a synonym of *L. roboris* which statement is confirmed by examination of the type specimen of *L. fasciatus.* Indeed, none of the species listed under *Lachnus* by Burmeister fall in the concept for the genus for which the name of *Cinara* is here used.

Key to Species of Cinara*

Doubtless some of these species are the same as Old World Species but the inadequacy of the descriptions of the latter and lack of type specimens make it advisable at present to use American names in many cases for the sake of clarity.

1. Cornicle not on distinct conical base. (Base very inconspicuous, narrow and not raised.) On *Abies* and *Pseudotsuga taxifolia* (Fig. 38 and Plate I, 1-7).......... 2
.... Cornicle on distinct conical base, mammiform (Fig. 14).......... 4
2. Hairs on dorsal side of hind tibia fine, numerous, reclinate; rostral IV .16 long (p. 42) .... *pseudotaxifoliae*
.... Hairs on dorsal side of hind tibia rather spinelike, hardly numerous, semierect (Fig. 39) 3
3. Distal half of hind tibia blackish; antennal III at least 3 times length of rostral IV (p. 43) .... *pseudotsugae*
.... Distal tip, only, of hind tibia blackish; antennal III 2-3 times length of rostral IV (p. 48) .... *splendens*
4. Cornicle base bearing both long and short hairs (Fig. 44).......... 5
.... Cornicle base bearing only one length of hairs.......... 6
5. Hairs on cornicle fine and numerous .02 and heavy and sparse .05-.07 long; hind tarsal II .27; rostral IV .20-.23; antennal III .50 (p. 47).......... *solitaria*
.... Hairs on cornicle fine and numerous .07 long and heavy and sparse .12-.14 long; hind tarsal II .45; rostral IV .20; antennal III .63-.65 (p. 38).......... *osborni*
.... As above except hind tarsal II .29; rostral IV .12-.16; III .26-.35 (p. 46).......... *sibiricae*

*Many species of *Cinara* from closely related host plants are separated with considerable difficulty, especially without comparison with typical specimens. A great deal of time has been spent by the writer on this group with the resulting conclusion that the species seem usually to be specific as to host. It seems best therefore to hold these species distinct until host transfer tests indicate otherwise. A number of such tests were attempted by the writer but none proved successful, seeming to indicate that the species of this genus are specific as to hosts. Further and more extensive tests should be made and carried through the sexual cycle.

6.	Hairs on abdomen minute, hardly exceeding .02 in length and very sparse	7
....	Hairs on abdomen distinctly longer than .02	9
7.	Rostral IV .24-.30 long (p. 31)	*glabra*
....	Rostral IV shorter than .24	8
8.	Antenna about 1 long, III shorter than .50 (p. 23)	*atra*
....	Antenna about 2 long, III much longer than .50 (p. 30)	*flexilis*
9.	Hairs on hind tibia of aptera not longer than diameter of tibia	10
....	Hairs on hind tibia of aptera longer than diameter of tibia	24
10.	Hind tarsal II hardly equalling one-tenth of length of hind tibia. On *Abies* (p. 28)	*curvipes*
....	Hind tarsal II distinctly shorter than one-tenth of hind tibia. With capitate hairs on body and appendages. On *Pinus.* (p. 23)	*arizonica*
....	Hind tarsal II one-tenth or more of length of hind tibia; hairs not capitate on body, may be blunt on hind tibia	11
11.	IV 1.5 or more times VI with unguis	12
....	IV shorter than 1.5 times VI with unguis	15
12.	Hairs on hind tibia .05 or longer	13
....	Hairs on hind tibia not longer than .05	14
13.	III not longer than .60. On *Pinus edulis* (p. 28)	*edulis*
....	III longer than .60. On *Abies* (p. 28)	*curvipes*
14.	Hind tibia with hairs stout and blunt. On *Picea parryana* (p. 27)	*coloradensis*
....	Hind tibia with hairs fine and pointed. On *Pinus ponderosa* var. *scopulorum* (p. 45)	*schwarzii*
15.	Hairs on hind tibia strongly reclinate, at angle of 30 degrees or less	16
....	Hairs on hind tibia at angle of more than 30 degrees with tibia	17
16.	Rostral IV .20-.23, antennal V not longer than IV (p. 45)	*schwarzii*
....	Rostral IV .28-.33, antennal V longer than IV (p. 50)	*thatcheri*
17.	Hind tarsal II .45-.50 (p. 31)	*fornacula*
....	Hind tarsal II .25-.30	18
....	Hind tarsal II .20-.23 (p. 26)	*burrilli*
18.	III shorter or rarely longer than .55	21
....	III rarely shorter than .55	19
19.	Hairs on hind tibia about .08 long, semi-spinelike	20
....	Hairs on hind tibia not longer than .05, spinelike (p. 25)	*brevispinosa*
20.	Hind tarsal II .45 long, exceeding fifth of length of hind tibia (p. 31)	*fornacula*
....	Hind tarsal II .28 long, shorter than fifth of length of hind tibia (p. 34)	*medispinosa*
21.	Hairs on hind tibia of aptera hardly half as long as diameter of tibia (p. 22)	*apini*
....	Hairs on hind tibia of aptera longer than half diameter of tibia	22
22.	Rostral IV .17-.20, V .07	23
....	Rostral IV .30 or more (p. 49)	*tanneri*
....	Rostral IV .22 (p. 41)	*pseudoschwarzii*
23.	Rostral IV .16-.18; dorsum with powdery pattern. On *Pinus* (p. 51)	*villosa*
....	Rostral IV .16; dorsum without noticeable powdery pattern. On *Picea.* (p. 50)	*vandykei*
....	Rostral IV .18-.21; dorsum with powdery pattern. On *Pinus.* (p. 40)	*ponderosae*
24.	Hairs on hind tibia of aptera once but less than twice as long as diameter of tibia	25
....	Hairs on hind tibia of aptera twice or more times as long as diameter of tibia	35
25.	Cornicle, at base, not more than .20 in diameter	26
....	Cornicle, at base, more than .20 in diameter	27
26.	Hind tibia in aptera longer than half body; rostrum about as long or longer than body. On *Pinus,* on cones (p. 37)	*oregonensis*
....	Hind tibia in aptera longer than half body; rostrum shorter than body (p. 39)	*piceicola*
....	Hind tibia in aptera not longer than half body; rostrum shorter than body. On *Sabina scopulorum* (p. 44)	*pulverulens*
27.	Tibial hairs at angle not exceeding 60 degrees	28
....	Tibial hairs at angle exceeding 60 degrees	32
28.	Hind tibia fully two-thirds length of body	29
....	Hind tibia less than two-thirds length of body	30
29.	Rostral IV not longer than .25; hind tarsal II .28 (p. 35)	*murrayanae*
....	Rostral IV longer than .25; hind tarsal II .28 (p. 32)	*hottesi*
....	Rostral IV .24-.29; hind tarsal II .40-.50. (p. 34)	*lasiocarpae*

30. Hind tarsal II longer than 1.5 times rostral IV (alata) (p. 33)........*juniperensis*
.... Hind tarsal II shorter than 1.5 times rostral IV........31
31. Rostral IV .25 long (p. 38)........*palmerae*
.... Rostral IV .18 long (ovipara) (p. 33)........*juniperensis*
32. Tibial hairs not numerous. On *Pinus edulis* (p. 49)........*terminalis*
.... Tibial hairs fairly numerous. On *Pinus sylvestris* (p. 40)........*pinea*
.... Tibial hairs numerous. On *Picea*........33
33. Rostral IV .20-.24. On *Picea parryana* (p. 24)........*braggii*
.... Rostral IV .15-.16. On *Picea engelmanni*........34
34. Hairs on hind tibia .15 long, 1.5 times diameter of tibia; body light brown; powdery (p. 29)........*engelmanniensis*
.... Hairs on hind tibia .08-.10, slightly longer than diameter of tibia in aptera. Body dark brown; naked (p. 50)........*vandykei*
35. Cornicle base small, .16-.20 in diameter; hairs on antenna .10 long (p. 36)........*occidentalis*
.... Cornicle as above in alata; hairs on antenna of alata short and sparse (p. 33)........*idahoensis*
.... Cornicle base medium, .22-.25 in diameter; hairs on antenna .10-.20 long (p. 51)........*winonkae*
.... Cornicle base large, .30 or more in diameter........36
36. III exceeding sum of IV and V; hairs of hind tibia .17-.25 long. On *Sabina scopulorum* (p. 45)........*sabinae*
.... III shorter than the sum of IV and V; hairs of hind tibia .14-.17 long. On *Juniperus sibirica* (p. 46)........*sibiricae*

Cinara apini (Gillette and Palmer)

The Spotted Short-haired Limber Pine Aphid

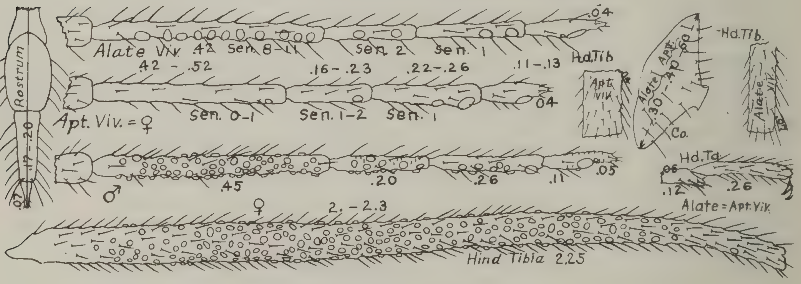

Fig. 14. *Cinara apini*

Lachnus apini Gillette and Palmer, 1924:31.
Cinara apini, Gillette and Palmer, 1931:846.

Fundatrix. Same as summer vivipara or with less powdery markings.

Apterous Summer Vivipara. Body dark brown; mottled with powder on median line, intersegmental lines and lateral areas; appendages yellowish to dusky; cornicle and distal two-thirds of hind tibia black. Body length 3.25-4; hind tibia 2.5-3; antenna 1.25-1.30; unguis rather short and blunt-conical. Rostrum attaining at least middle of abdomen. Hairs tending to be spinelike, moderately numerous; on body .05-.07 long; on cornicle slightly longer; on hind tibia hardly as long as half diameter of tibia.

Alate Vivipara. Head and thorax black; abdomen dark golden brown; marked with white secretion on vertex, middle and sides of pronotum, sutures on mesonotum, entire scutellum and on abdomen, on median line, intersegmental lines and lateral areas; cornicle, cauda, knees, most of tibiae and femora and entire tarsi black. Same as aptera in measurements.

Secondary sensoria, round, convex. Hairs as in apterous vivipara except on hind tibia fully as long as diameter of tibia. Fore wing with media faint and twice-forked.

Ovipara. Same as apterous vivipara except as follows: Abdominal VI, VII and VIII heavily covered with white secretion and hind tibia slightly swollen on proximal half and covered almost to tip with numerous small sensoria.

Male. Alate. Color pattern, wings and hairs as in alate vivipara. Body length 2.30; hind tibia 1.50; antenna 1.25; secondary sensoria tuberculate and numerous on III, IV and V.

Egg. Newly laid, yellowish brown; later, black, lightly covered with white secretion. Placed end to end lengthwise on upperside of needles. Size .93 by .40.

Collections. On *Pinus flexilis,* on bark of twigs and small branches; in large colonies; quite sluggish and slow to escape. Generally in northern Colorado. Idaho: Beaver Creek. Apterous summer viviparae July 4 to October 5, alate viviparae July 7 to Sept. 27, sexuales Sept. 2 to Oct. 5; very common.

Type. U.S.N.M. No. 41964. Paratypes, Colo. Agr. Exp. Sta. Collection. Metatypes, Hille Ris Lambers Collection.

Chief Distinguishing Characters. Short tibial hairs (hardly exceeding half diameter of tibia in apterous vivipara), length of rostral IV (.17-.20), number of sensoria on III in alata (8-11) and color of body (dark brown).

Cinara arizonica (Wilson)

The Giant Pine Aphid

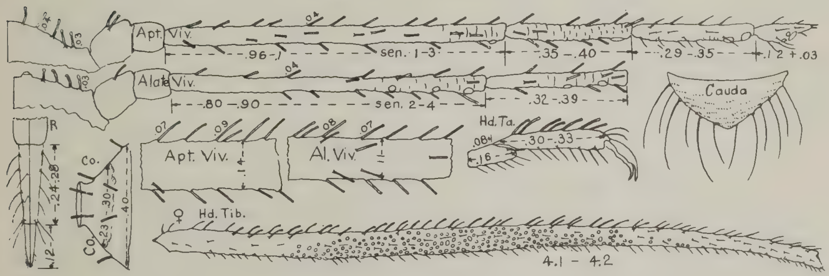

Fig. 14a. *Cinara arizonica*

Lachniella arizonica Wilson, 1919b:22.
Cinara arizonica, Palmer, 1945:448.

Apterous Summer Vivipara. Grayish black; marked with numerous powdery areas; cleared specimens with numerous dark speckles and faint reticulations, antennal I, II, VI and distal portions of III, IV and V blackish to black; legs black except bases of femora and short area below knees on tibiae; cornicle and cauda black; cornicle often fully colored on only apical zone, thus appearing to vary markedly in size. Body length 5-6; across eyes .90; antenna about 2; hind tibia 4-5.1; rostrum attaining nearly to cornicles. Hairs slightly but distinctly globate on entire dorsum, antennal I-IV, legs except ventral side of tarsi, but simple on antennal V and VI, cauda, anal plate and venter of body; on side of abdomen .03-.04 long.

Alate Vivipara. Color and measurements same as in apterous vivipara except head and thorax which are black.

Ovipara. Body length 4.6-5.5; antenna about 2; hind tibia slightly swollen and bearing numerous minute sensoria along most of its length.

Collections. On stems of *Pinus ponderosa* var. *scopulorum.* Colorado: near Sterling. Apterous viviparae Sept. 12 to Oct. 24, alate vivipara Oct. 24, oviparae Oct. 24; rare but extremely abundant where taken.

Type: Granovsky Collection or U.S.N.M.

Chief Distinguishing Characters. Slightly capitate hairs on body and appendages, unusually large size of body (5-6), short stubby antennal VI, broken powdery covering on dorsum of body.

Cinara atra (Gillette and Palmer)

The Black Pinyon Pine Aphid

Lachnus ater Gillette and Palmer, 1924:37.
Cinara atra, Gillette and Palmer, 1931:847.

Apterous Summer Vivipara. Young. Newborn, orange-yellow mottled with green, later olive-brown to reddish. *Adult.* Shining black or dark brown; antenna yellowish proximally on III, IV and V, dusky distally; tibiae yellowish on middle or blackish throughout. Body length

2-3; hind tibia 1.3-1.8; antenna 1.05. Hairs on hind tibia shorter than diameter of tibia; on body and cornicle .01-.02 long. Rostrum about same length as body.

Alate Vivipara. Same as apterous vivipara in measurements. Hairs medium in texture and hardly numerous; on hind tibia attaining .06-.09, length equalling 1-1.5 times diameter of tibia. Fore wing with media variable, either once- or twice-forked.

Ovipara. Same as apterous vivipara except hind tibia which is moderately swollen on proximal half and bearing irregular flat sensoria along almost entire length.

Male. Apterous. Color same as ovipara. Body length 1.25; hind tibia 1.15; antenna .80-.90.

Egg. Black, shining. Size 1.1 by .5.

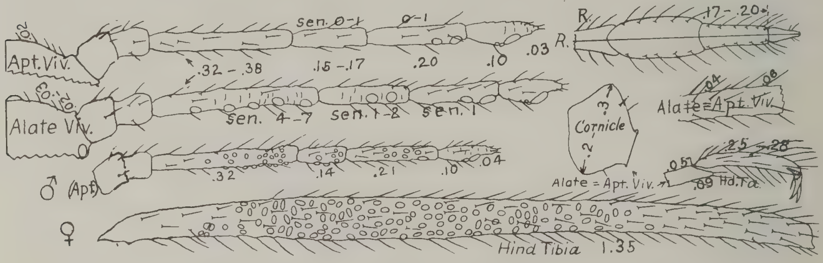

Fig. 15. *Cinara atra*

Collections. On *Pinus edulis,* on bark of limbs in small colonies. Colorado: Owl Canyon (east of Livermore). Apterous summer viviparae Aug. 6 to Oct. 19, alate viviparae Aug. 6, oviparae Oct. 27 to Nov. 6, males Oct. 6; fairly common.

Type. U.S.N.M., No. 41966. Paratypes, Colo. Agr. Exp. Sta. Collection. Metatypes, Hille Ris Lambers Collection.

Chief Distinguishing Characters. Shining black body, short hair on appendages (.04-.09) and on body (.01-.02), length of rostral IV (.17-.20), comparatively short antenna (III shorter than .40) and unguis short and conical.

Cinara braggii (Gillette)

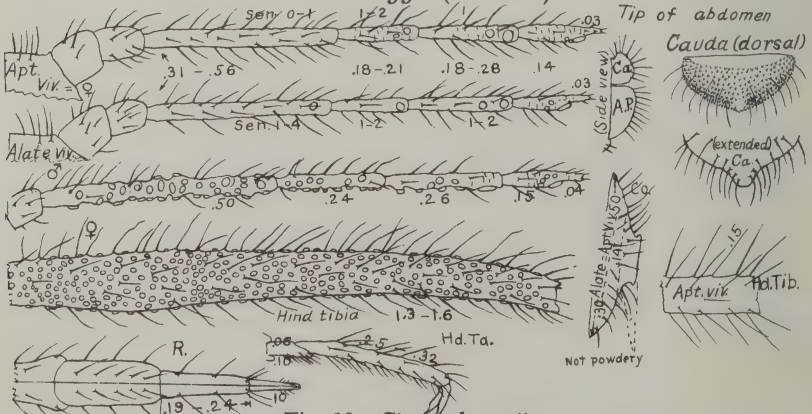

Fig. 16. *Cinara braggii*

Lachnus braggii Gillette, 1917a:138.
Cinara glehna (Essig), Gillette and Palmer, 1931:855 (misidentification).

Fundatrix. Same as apterous summer vivipara except antennal III and IV which are sometimes fused.

Apterous Summer Vivipara. Nymph. Body pale yellow to brownish with two longitudinal rows of pale greenish spots; lightly covered with pulverulence. Cornicle, tarsi and genital plate black. *Adult.* Body yellow-brown to dark brown; dorsum mostly covered with heavy powder leaving a naked dark band on abdominal V and only spots and dashes on other segments; venter lightly pulverulent; legs pale except mere tips of tibiae and of antenna. Rostrum, entire tarsi, cauda, cornicle, anal and genital plates black.

Body length 3-4; hind tibia 1.3-1.7; antenna 1.10-1.17; cornicle in life covered with powder to diameter of .14; rostrum attaining 3d coxa to abdominal II. Hairs rather fine; on hind tibia 1.5 times as long as diameter of tibia.

Alate Vivipara. Same as aptera in color and measurements. Hairs on hind tibia 2-3 times as long as diameter of tibia.

Ovipara. Apterous. Head and thorax dark; abdomen pale yellow with dark band on abdominal V and dashes and spots on other segments; covered except on dark areas with pulverulence as in vivipara and also with entire body posterior to cornicles heavily pulverulent; cornicle black; entire hind tibia dusky. Measurements same as apterous vivipara. Hind tibia considerably swollen on distal half and thickly covered with sensoria along entire length.

Male. Alate. Body blackish brown; more or less powdery. Body length 2.20; antenna 1.34; hind tibia 1.46. Otherwise as in alate vivipara.

Egg. Black; naked. Size 1.25 by .55.

Collections. On *Picea pungens,* on bark of twigs and small branches; in colonies. Colorado: Boulder, Denver and Fort Collins. Utah: Nephi, Salt Lake City, River Heights and Logan. Fundatrices Apr. 13 to 21, apterous summer viviparae Apr. 22 to July 26, alate viviparae May 11 to June 22, sexuales Oct. 23 to Nov. 13; rather common in parks.

Type. U.S.N.M., No. 41940. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Pale body, of nymphs especially, and pale appendages, heavy pulverulent covering, long hairs on tibiae, length of III (not less than .40), length of rostral IV (.19-.24) and considerably swollen hind tibia in ovipara (about twice normal diameter).

The fact that infestations of this species have been found mostly in parks and cities instead of in nature may indicate that it is introduced. Indeed, the resemblance to *C. piceicola* is very close, but Cholodkovsky states "little pulverulence" while *C. braggii* is heavily pulverulent, III of alate vivipara of *braggii* shows fewer sensoria (1-4 not 4-7), and hind tarsal II is shorter than that of *C. piceicola* (.25-.32, not .38-.49).

This species is very close to *C. glehna* (Essig) and was formerly considered identical by the author but further study throws doubt on this synonymy. The only differences appear to be as follows: The longer III (.40-.56 not .31), longer rostral IV (.19-.24 not .17) and paler appendages (not mostly dusky).

Cinara brevispinosa (Gillette and Palmer)

The Short-haired Lodgepole Pine Aphid

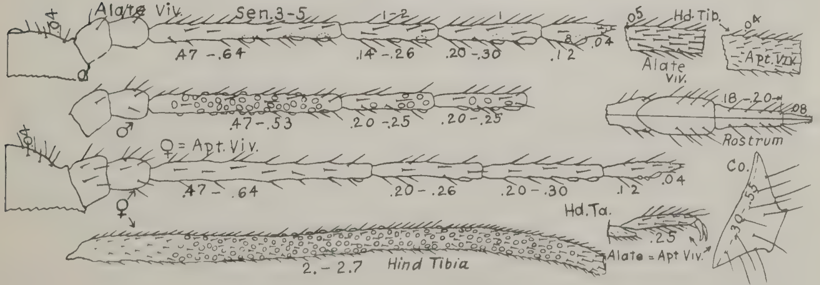

Fig. 17. *Cinara brevispinosa*

Lachnus brevispinosus Gillette and Palmer, 1924:27.
Cinara brevispinosa, Gillette and Palmer, 1931:848; Knowlton, 1930:154.

Fundatrix. Similar to apterous summer vivipara.

Apterous Summer Vivipara. Color same as *Cinara medispinosa* unless with less pulverulence. Body 3; antenna 1.50; hind tibia 2-2.70. Hairs blunt, stout and numerous; on hind tibia equalling nearly half of the length of diameter of the tibia.

Alate Vivipara. Head and thorax black; abdomen light pinkish cinnamon; without pulverulence; antenna except proximal portions of III and IV, cornicle, cauda and anal and genital plates and entire legs black. Fore wing slightly smoky; media faint and twice-branched. Body length 2.25-2.50; hind tibia 2; antenna 1.15; unguis short and heavy-conical; rostrum attaining middle of abdomen. Hairs heavy, spinelike and rather numerous; on antenna and hind tibia drooping, shorter than diameter of tibia; on body same length but of finer texture.

Ovipara. About the same as apterous vivipara or darker in older examples. Hind tibia very slightly swollen on proximal half and bearing numerous rather tuberculate sensoria along almost entire length.

Male. Alate. Same as alate vivipara except somewhat smaller and darker and III, IV, and V bearing numerous sensoria.

Collections. On *Pinus contorta* var. *murrayana*, on bark of twigs and small branches; in colonies. Colorado: Rocky Mountain National Park, Chambers Lake (at head of Poudre River), Pingree Park and Bellvue foothills. Utah: Logan Canyon. Idaho: Boise. Fundatrices May 22 to June 13, apterous summer viviparae June 17 to Aug. 30, alate viviparae June 30 to July 17, sexuales Aug. 8 to Oct. 2; rather common.

Type. U.S.N.M., No. 41962. Paratypes, Colo. Agr. Exp. Sta. Collection.

This species agrees very closely with *C. medispinosa*, differing only in the shorter and stouter tibial hairs (shorter than .07). Breeding tests with viviparae (Gillette and Palmer, 1924:29) indicate the hereditary character of the tibial hair length in these forms of the life cycle. No tests through the sexual cycle were made. From *C. schwarzii* it is separated as follows: Stouter tibial hairs, slightly shorter rostral IV (not longer than .20) and color of body (more yellowish brown and almost without pulverulence). These latter species are, however, separated with difficulty and biological host transfer investigations should be attempted. *C. apini* very closely resembles this species but differs in slightly finer tibial hairs which are slightly longer (.06-.07 in alata) and more pulverulence on body, especially on the tip of the abdomen of the ovipara.

Cinara burrilli (Wilson) n. comb.

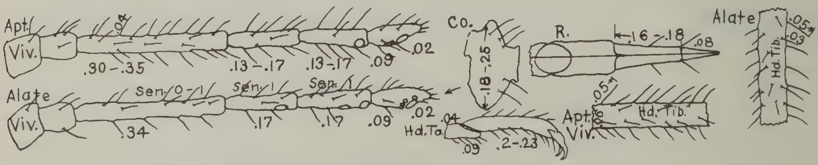

Fig. 18. *Cinara burrilli*

Lachniella burrilli Wilson, 1919b:42.
Lachnus burrilli, Knowlton, 1930:158 (misidentification for *pulverulens* Gillette and Palmer).

Apterous Summer Vivipara. "Black with pruinose patches and black spots; cornicle and tips of tibiae black." Body length 2.5-3; across eyes .60-.64; antenna .83-.90; hind tibia 1.25-1.50; rostrum attaining between abdominal III and V. Hairs fine; .05 long on vertex and body.

Alate Vivipara. Same as apterous vivipara except head and thorax dark.

Collections. On twigs of *Juniperus scopulorum*. Idaho: Twin Falls. Alate and apterous viviparae July 6; apparently rare.

Type. Granovsky Collection. Paratypes, Knowlton and Colo. Agr. Exp. Sta. Collections.

Chief Distinguishing Characters. Color pattern, scarcity or lack of sensoria on III in alate vivipara and shortness of the hairs (not longer than .05-.06).

Cinara coloradensis (Gillette)

The Black Polished Spruce Aphid

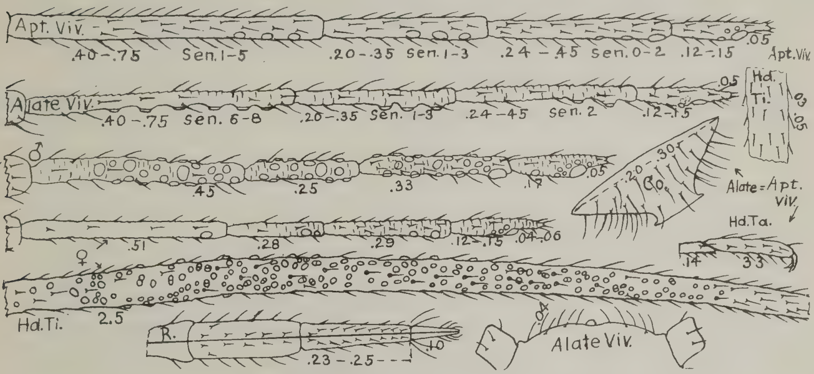

Fig. 19. *Cinara coloradensis*

Lachnus coloradensis Gillette, 1917a:133; Knowlton, 1930:157.
Cinara coloradensis, Gillette and Palmer, 1931:849.

Fundatrix. About the same as apterous summer vivipara.

Apterous Summer Vivipara. Young Nymph. Pale gray with dusky green on head and region of cornicles, thorax nearly white; abdomen dusky to brownish. *Adult.* Brownish black, more or less rufous on head and thorax; with little or no pulverulence, appendages pale to brown with black on ends of femora, knees, tips to distal three-quarters of tibiae and entire tarsi. Body 3.35-4.3; hind tibia 3-3.2; antenna 1.6-2. Length of hairs on hind tibia, equalling third of diameter of tibia.

Alate Vivipara. Same as aptera in measurements. Secondary sensoria tuberculate. Rostrum attaining middle of abdomen. Fore wing with media twice-forked. Hairs on hind tibia short, usually blunt, stout, drooping, length equalling half of diameter of tibia, rather sparse; hairs on body pointed, slightly longer than on tibia and erect.

Ovipara. Cinnamon-brown to brownish black, shining; with head and thorax sordid pale yellowish green to light brown; venter pale greenish yellow, darker posteriorly and laterally; dorsum and sides of abdomen behind cornicles heavily covered with white secretion. Body length 3; antenna 1.50; hind tibia hardly swollen but covered with sensoria for nearly entire length.

Male. Alate. Same as alate vivipara except as follows: Body length 2.70; antenna 1.45; hind tibia 2.12.

Egg. Black; covered with short waxy threads from the abdomen of ovipara, applied by her hind tarsi. Laid lengthwise in a single row on upper surface of needle. Size 1.26 by .60.

Collections. On *Picea pungens* and *P. engelmanni,* on bark of twigs and small branches, in colonies. Colorado: Loveland, Rocky Mountain National Park (alt. 8000), Grand Junction (Alexander Lakes, alt. 10,000) and Fort Collins. Utah: Logan. Fundatrices April 20, apterous summer viviparae June 6 to Oct. 13, alate viviparae May 12 to Sept. 19, sexuales Aug. 18 to Nov. 12; fairly common, especially in parks.

Type. U.S.N.M., No. 41941. Paratypes, Colo. Agr. Exp. Sta. Collection.

This species is very closely allied to *C. curvipes,* differing as follows: Smaller size (body not 5 long), smaller number (7-8 not 8-12) and more distal location of secondary sensoria on III of alate vivipara, hairs on hind tibia not blunt or curved and not numerous, and hind tarsal II longer than tenth of tibia, as well as infesting a different genus of host plant *(Picea* not *Abies)*.

Cinara curvipes (Patch)

The Bow-legged Fir Aphid

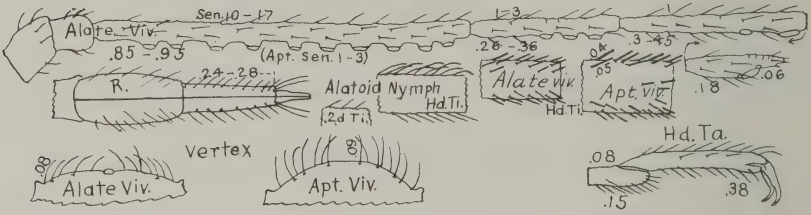

Fig. 20. *Cinara curvipes*

Lachnus curvipes Patch, 1912a:161; Wilson, 1923:267; Knowlton, 1930:158.
Cinara curvipes, Gillette and Palmer, 1931:850.
Cinara utahensis Knowlton and Smith, 1938b:66 (new synonymy).

Apterous Summer Vivipara. Brownish black with cornicle, cauda and anal plate black; with very little or no pulverulence; antenna pale; legs brown with tarsi, tips of 1st and 2d tibiae and nearly entire 3d tibia black; rostrum black distally. Body 5 long; hind tibia 3.5-4.6; hind tarsal II .38; antenna 2-2.2, secondary sensoria 1-3 on III, 1 on IV and 1 on V; cornicle about .45-.55 in diameter at base. Hind tibia distinctly curved. Hairs on hind tibia drooping, rather stout, usually blunt, numerous, not longer than half of diameter of tibia; curved and pointed in nymph and sometimes in adults; hairs on body pointed .06-.08 and erect.
Rostrum attaining middle of abdomen.

Alate Vivipara. Same in color and measurements as apterous vivipara. Secondary sensoria tuberculate. Fore wing with media twice-forked.

Ovipara. Apterous. Color, according to Knowlton (1930:158), with flocculence back of cornicles. Measurements same as summer apterous vivipara. Hind tibia very slightly swollen on proximal half and with numerous small sensoria on entire length.

Collections. On *Abies lasiocarpa,* and *A. concolor* and *Picea engelmanni,* on bark. Colorado: Eldora, Ouray, Pingree Park and Rocky Mountain National Park. Utah: Smithfield Canyon, Salt Lake City, Logan and Beaver. Fundatrices (?) June 13 and 24, apterous summer viviparae June 24 to Aug. 28, alate viviparae July 8 to Aug. 28, oviparae Aug. 28 and Sept. 20; rather rare but often occurring in abundance where found.

Type. Maine Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Short blunt hairs on hind tibia, comparatively short hind tarsus (not exceeding tenth of length of hind tibia) and long curved hind tibia.

Cinara edulis (Wilson)

The Black and White Spotted Pinyon Pine Aphid

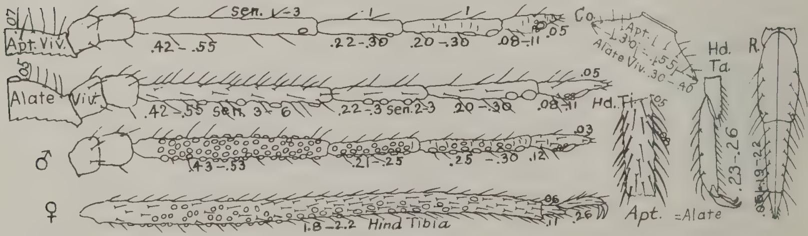

Fig. 21. *Cinara edulis*

Lachnus edulis Wilson, 1919b:44; Palmer, 1926:314; Knowlton, 1930:155.
Cinara edulis, Gillette and Palmer, 1931:851.

Fundatrix. Same as apterous summer vivipara.

Apterous Summer Vivipara. Nymph. First instar, dark brown with median line and meso- and metathorax pale; appendages pale. *Adult.* Shining black with fine median line and lateral patches powdery; legs mostly blackish, light portions orange-yellow. Body 3-4 long; hind tibia 2.5-3; hind tarsal II .26; antenna 1.3-1.5.

Alate Vivipara. Same as aptera in color and measurements. Antenna with secondary sensoria somewhat tuberculate. Rostrum attaining abdominal V. Hairs on hind tibia fine, pointed, numerous; on body about the same or slightly shorter.

Ovipara. Apterous. Without powdery tip on posterior segments of abdomen; same as apterous summer vivipara except as follows: Body more elongate and hind tibia very slightly swollen on proximal half and bearing small, convex sensoria scattered over nearly entire length.

Male. Alate. Black throughout; wings smoky. Body length 1.50; antenna 1.05. Other measurements as in alate vivipara.

Egg. Jet black; without powder. Length 1.35. Laid lengthwise in rows of 6-8 on upperside of needles of pine.

Collections. On *Pinus edulis,* bark of limbs and older twigs; in large colonies. Colorado: Owl Canyon (in Larimer County), Salida, Trinidad and Walsenburg. Utah: Hannah, Tabiona and Mount Alice. Fundatrices May 24 to June 8, apterous viviparae May 27 to Sept. 25, alate viviparae May 27 to Sept. 18, sexuales Oct. 18 to 28; common. As recorded by Knowlton (op. cit.) on *Pinus monophylla* (Utah: Raft River Mountains. Alate and apterous viviparae, June 19), occurred a form differing from *edulis* apparently only in IV being one-fifth shorter than V instead of approximately equal.

Cotypes. Granovsky and Colo. Agr. Exp. Sta. Collections.

This species is structurally very close to *C. schwarzii,* but differs slightly as follows: Orange-yellow legs, slightly pulverulent body markings, length of hairs (longer than .03-.05 on hind tibia) and host plant. Since it is the rule for this genus to be specific as to host plant, it seems best to count the species distinct until biological tests settle the identity.

Cinara engelmanniensis (Gillette and Palmer)

The Light Brown Spruce Aphid

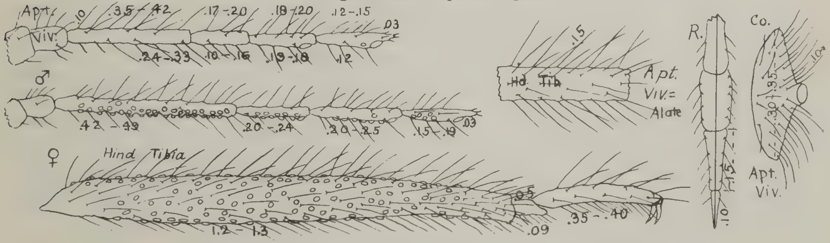

Fig. 22. *Cinara engelmanniensis*

Lachnus engelmanniensis Gillette and Palmer, 1925:527.
Cinara engelmanniensis, Gillette and Palmer, 1931:852.

Apterous Summer Vivipara. Sordid tan; with two rows of blackish areas from pronotum to tip of abdomen, areas confluent on abdominal VII and VIII; pulverulence evident only on intersegmental lines; cornicle hardly darker than body; legs pale with only tarsi and tips of tibiae blackish; antenna pale, dark only on tips of segments and entire I, II and VI. Body 3 by 2; antenna .90-1.1*; hind tibia 1.2-1.3, hind tarsal II .35-.40. Hairs on hind tibia rather fine, numerous, 1.5 times as long as diameter of tibia; on antenna and body .10. Rostrum attaining between abdominal I and II.

*In original description, apterous vivipara may have been immature ovipara.

Ovipara. Apterous. Yellowish brown with a longitudinal pair of darker lines or rows of spots; pulverulent only on intersegmental lines, without pulverulence on tip of abdomen; appendages as in vivipara. Body 3 by 1.7; hind tibia 1.3.

Male. Alate. Head and thorax brown; abdomen light apple-green with two longitudinal rows of darker green spots; pulverulence very slight, evident on lateral areas; appendages as in above forms except III, IV and V which bear numerous sensoria.

Egg. Shining honey-yellow to yellow-brown when laid; becoming black in a few days; naked. Deposited lengthwise end to end on upperside of needles of tree.

Collections. On *Picea engelmanni* on bark of twigs; in small colonies or scattered. Colorado: Laramie-Poudre Tunnel, foot of Long's Peak, Pingree Park, Cameron Pass and Black Mesa. Apterous summer viviparae July 9 to Aug. 20, oviparae Sept. 9 to Oct. 21, alate males Sept. 3; apparently rare.

Type. U.S.N.M., No. 41943. Paratypes, Colo. Agr. Exp. Sta. Collection.

This species differs from *C. glehna* (Essig) mainly as follows: Presence of very little pulverulence (while the latter is heavily pulverulent), once-forked media of fore wing and length of rostral IV (shorter than .19-.24). From *C. piceicola* (Cholodkovsky)* it differs as follows: Pale hind tibia (not "one-half tibia dark"), shorter rostral IV (.15, not .20) and shorter hind tarsal II (.30-.35, not .38-.49).

Cinara flexilis (Gillette and Palmer)

The Black Limber Pine Aphid

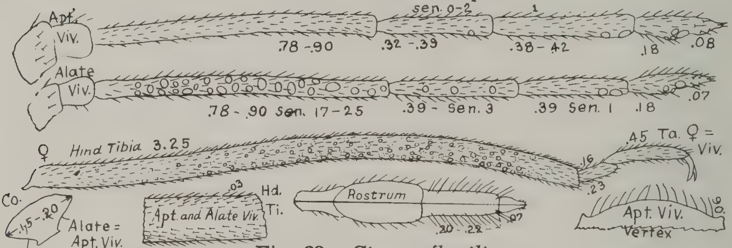

Fig. 23. *Cinara flexilis*

Lachnus flexilis Gillette and Palmer, 1924:30.
Cinara flexilis, Gillette and Palmer, 1931:853.

Apterous Summer Vivipara. Brownish black throughout (greenish on thorax in younger examples); dull or shining, without pulverulence; legs dusky orange, with knees, tarsi and two-thirds or more of hind tibia and distal one-third or more of 1st and 2d tibiae black. Wings slightly smoky, stigma and costal margin dark. Body 4-5 by 2; antenna 2; hind tibia 3.25; hind tarsal II .45. Hairs on body .01-.03, rather sparse; on hind tibia not longer than third of diameter of tibia, medium in texture, very drooping, sometimes curved inward or lying nearly flat, very numerous; on antenna similar but less numerous. Rostrum attaining middle of abdomen. Tibiae and tarsi rather heavy.

Alate Vivipara. Same in color and measurements as aptera. Secondary sensoria irregular and flat. Fore wing with media twice-forked. Very active and quick to escape.

Ovipara. Apterous. Same in color and measurements as apterous vivipara. Without powdery secretion on tip of abdomen; shape of body slightly elongate, hind tibia not noticeably swollen, bearing very small and inconspicuous sensoria along almost entire length.

Egg. Black, naked. Size 1.00 by .35.

Collections. On *Pinus flexilis*, on bark of twigs and small branches; rather scattered, not in colonies. Colorado: near Estes Park. Apterous viviparae July 22 to Aug. 18, alate viviparae July 22, oviparae Sept. 18 and 21; apparently rare.

Type. U.S.N.M., No. 41963. Paratypes, Colo. Agr. Exp. Sta. Collection. Metatypes, Hille Ris Lambers Collection.

*According to original description and metatype specimens.

Chief Distinguishing Characters. Diameter of cornicle (not exceeding .20), length of rostral IV (.20-.22), rather numerous tibial hairs, length of III (.78-.90), character of sensoria on III of alate vivipara (flat and irregular, and their number (17-25), length of hind tarsal II (.45, greater than tenth of length of tibia), length of hind tibia (about 3) and tibial hairs not blunt or curved.

Cinara fornacula Hottes

Cinara fornacula Hottes, 1930:186; Gillette and Palmer, 1931:854 (immature specimen).

Apterous Summer Vivipara. Light green; with moderate pulverulence throughout; appendages yellow-brown, with tarsi, tips of tibiae and of antennal V and VI and terminal segments of rostrum dark; cornicle pale; cauda and anal plate dusky. Body length about 3; antenna 1.20; III .55, IV .22, V .23, VI .16+.03; cornicle .22-.25; hind tibia about 2; hind tarsal II .52; rostral IV .20, V .10, attaining abdominal II. Hairs on body .09; on vertex .06-.07; on antennal III .03-.06, about same length as diameter of III; on hind tibia at angle of 45-50 degrees, fine to semispinelike, .05-.10 long (diameter of tibia .10).

Collections. On *Picea pungens*, on bark of twigs. Colorado: Cameron Pass and Skyway. Apterous viviparae July 15 and Aug. 26; apparently rare.

Type. University of Minnesota Collection.

This species in some ways resembles *C. occidentalis* but differs as follows: Larger size of body (over 3, not 2-3 long), absence of flocculence, longer tarsal II (.45-.50 not .30-.40), longer rostral IV (.20-.22 not .13-.14) and relatively shorter tibial hairs (not longer than diameter of tibia instead of twice as long).

This species may be *C. piceicola* var. *viridescens* (Cholodkovsky) (1896c and 1898 *Lachnus)* as comparison with the original description of *viridescens* and with metatype specimeans of *piceicola* has revealed no reliable differences in structure. However, the form is here retained as distinct since examination of the type specimens (hardly available at present) might bring forth some distinction. *C. fornacula* seems to lack the green dorsal stripes and the habit of living in colonies as described by Cholodkovsky.

Cinara glabra (Gillette and Palmer)

The Glabrous Ponderosa Pine Aphid

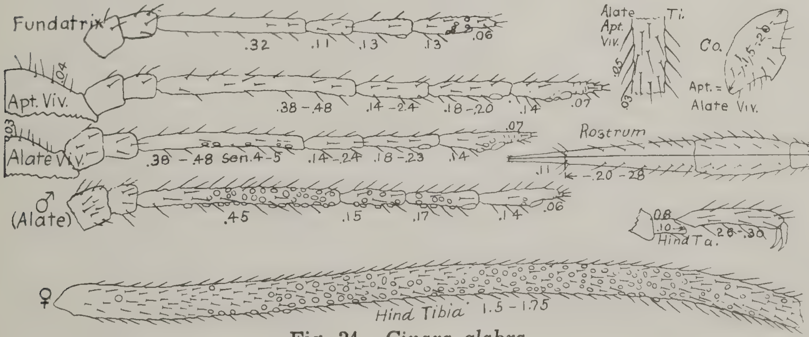

Fig. 24. *Cinara glabra*

Lachnus glabra Gillette and Palmer, 1924:35.
Cinara glabra, Gillette and Palmer, 1931:854.

Fundatrix. Same as apterous summer vivipara except as follows: Hind tibia 1.15; antenna .86.

Apterous Summer Vivipara. Nymph. Colorless, shading to pale orange posteriorly, appendages colorless throughout. *Adult.* Dusky olive-green to olive-brown to black; shining on head; without powder on dorsum; surface of body shagreened; legs mostly dusky, lighter portions orange-brown; wings slightly smoky. Body 3 by 2; hind tibia 1.5-1.7; antenna 1.10, unguis unusually stout; hind tibia 1.75; rostrum attaining abdominal VII. Hairs on body minute, .01-.02 long, sparse; on hind tibia about half as long as the diameter of tibia. Ocular tubercle plainly evident.

Alate Vivipara. Same in color and measurements as apterous vivipara. Secondary sensoria flat, irregular in size.

Ovipara. Apterous. Same as summer vivipara (tip of abdomen not covered with pulverulence), except hind tibia which though not perceptibly swollen is covered throughout with numerous flat sensoria.

Male. Alate. Color same as alate vivipara. Body length 2; hind tibia 1.20; antenna 1, sensoria tuberculate and numerous on III, IV and V.

Collections. On *Pinus ponderosa* var. *scopulorum,* on twigs at bases of needles; solitary or in small colonies. Colorado: Rocky Mountain National Park, Big Thompson Canyon, Log Cabin, foothills near Fort Collins, Bellvue and Denver. Fundatrices May 11, apterous summer viviparae May 25 to Aug. 20, alate viviparae June 25 to Aug. 20, sexuales Sept. 10 to Oct. 22; rather common.

Type. U.S.N.M., No. 41965. Paratypes, Colo. Agr. Exp. Sta. Collection. Metatypes, Hille Ris Lambers Collection.

Chief Distinguishing Characters. Black body, lack of pulverulence, short hairs especially on body and heavy nearly cylindrical unguis, length of hind tibia (1.5-1.7), length of body (about 3), lack of pulverulence on tip of abdomen of ovipara and length of rostral IV (.24-.30).

Cinara hottesi (Gillette and Palmer)

The Yellow-legged Spruce Aphid

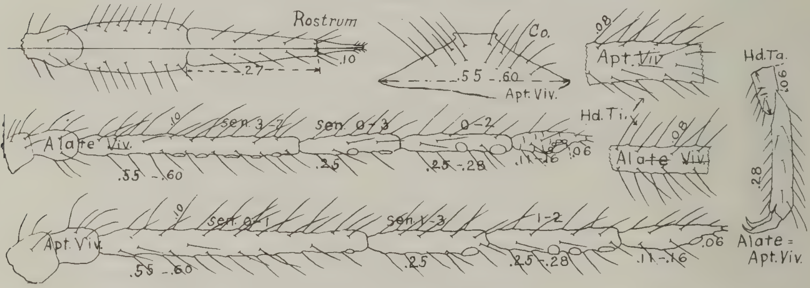

Fig. 25. *Cinara hottesi*

Lachnus hottesi Gillette and Palmer, 1924:22; Knowlton, 1930:156.
Cinara hottesi, Gillette and Palmer, 1931:857.

Fundatrix. Same as apterous summer vivipara.

Apterous Summer Vivipara. Bluish to brownish black; without pulverulence; legs conspicuously yellow, with only tarsi and tips of tibiae black; rostral III, IV and V, cornicle, cauda, anal and genital plates black. Body length 2.8-3.5; hind tibia 1.7-2.5; antenna 1.55-1.6; rostrum attaining tip of abdomen. Hairs fine; on hind tibia slightly exceeding diameter of tibia; on body, cornicle and III .10, twice as long as diameter of III.

Alate Vivipara. Same in color and measurements as aptera.

Collections. On *Picea engelmanni,* on bark of young limbs. Colorado: Rocky Mountain National Park, Eldora, Pingree Park and Rabbit Ears Pass. Utah: Logan and Logan Canyon. Idaho: Immigration Canyon. Fundatrices June 13 (alt. about 9,000), apterous summer viviparae June 24 to Aug. 21, alate viviparae* July 17; rare.

Type. U.S.N.M., No. 41959. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Black body without pulverulence, moderately long tibial hairs (.08-.10) and long rostral IV (.26-.27), almost equal to hind tarsal II.

*Reared in insectary from fundatrices.

Cinara idahoensis Knowlton

Cinara idahoensis Knowlton, 1935b:283.

Alate Vivipara. Body length about 2; across eyes .50; antenna .80, III .24, without sensoria, IV .10, with one secondary sensorium, V .14, VI ".13+.02"; cornicle .17 in diameter at base; rostral IV .15, V .07, attaining nearly to tip of abdomen; hind tibia 1.25; hind tarsal II .23. Hairs on hind tibia at angle of over 45 degrees, .14-.18 long, about twice as long as diameter of tibia; on antenna short, sparse and inconspicuous.

*Apterous Summer Vivipara.** Indistinguishable from *C. winonkae.*

Collections. On *Thuja* sp. Idaho: Twin Falls. Alate vivipara (a single specimen) and apterous viviparae April 12.

Type. Knowlton Collection.

This species is distinguished from *C. winonkae* only by inconspicuous hair on the antenna of the alate form and that only a single specimen. Study of a larger number of alatae may settle the status of this form.

Cinara juniperensis (Gillette and Palmer)

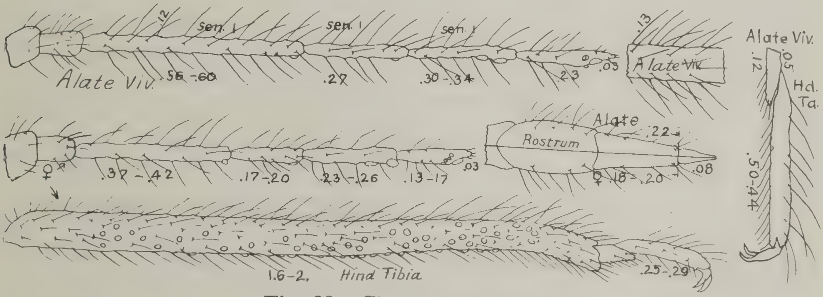

Fig. 26. *Cinara juniperensis*

Lachnus juniperensis Gillette and Palmer, 1925:526.
Cinara juniperensis, Gillette and Palmer, 1931:858.

Alate Vivipara. Head and thorax blackish, abdomen light greenish brown; slight pulverulence on thorax and on abdomen on intersegmental lines and lateral areas anterior and posterior to cornicles; appendages yellowish with dusky tips on segments, hind tibia dusky on distal third to half. Fore wing with radial sector and 1st anal vein ending in smoky brown area. Body length 4; hind tibia 3.2; antenna 1.75; cornicle about .40 in diameter at base.

Hairs on hind tibia 1.5 times as long as the diameter of tibia; on antenna and body .12. Rostrum attaining about middle of abdomen. Fore wing with media only once-branched.

Ovipara. Apterous. Yellowish to dark brown throughout with abdominal VII and VIII pulverulent; appendages dusky except proximal half of III; cornicle black. Body 3.5 by 2; hind tibia 1.6-2; antenna 1.3; cornicle .25-.40 in diameter at base of cone. Hairs as in alata. Hind tibia hardly swollen but bearing scattered sensoria along almost entire length.

Egg. Black; naked. Size 1.4 by .6.

Collections. On *Juniperus sibirica,* on bark of twigs. Colorado: Rocky Mountain National Park and Pingree Park. Alate viviparae Aug. 20, oviparae Aug. 24; rare.

Type. U.S.N.M., No. 41944. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Pulverulence generally slight but heavy on tip of abdomen of ovipara, moderately long tibial hairs (.13) and long hind tarsal II (in alata .44 about twice as long as rostral IV).

This species needs further investigation, as very few specimens have been taken. The difference in length of hind tarsus in the two forms studied seems strange. No life cycle observations have been made.

*Cotypes.

Cinara lasiocarpae (Gillette and Palmer)

The Spotted Alpine Fir Aphid

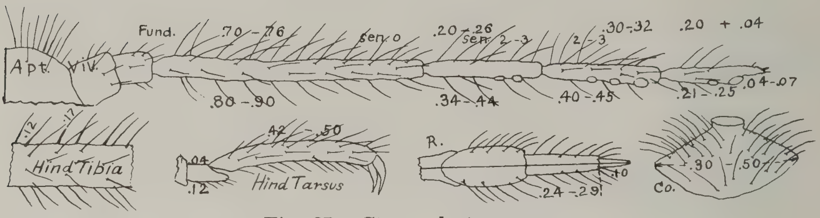

Fig. 27. *Cinara lasiocarpae*

Lachnus lasiocarpae Gillette and Palmer, 1930:543.
Cinara lasiocarpae, Gillette and Palmer, 1931:858; Hottes, 1933:4.

Fundatrix. Same as apterous summer vivipara except antenna 1.9.

Apterous Summer Vivipara. Reddish to dark brown, mottled with broken pattern of white pulverulence; legs almost entirely black. Body length 4-5; robust; hind tibia 3.5; antenna 2. Hairs on hind tibia spinelike, longer than diameter of tibia. Rostrum attaining cornicle.

Ovipara. Similar to apterous vivipara.

Collections. On *Abies lasiocarpa*, on bark of twigs. Colorado: Rocky Mountain National Park, Black Mesa, Skyway and Rabbit Ears Pass. Utah: Logan Canyon. Fundatrices June 10, July 7 and 22 (alt. 9,000 and 10,000 ft.), apterous summer viviparae July 7 to Aug. 12, alatoid nymphs in late Aug., oviparae Aug. 24; rare.

Type. U.S.N.M., No. 42082. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Large body (4-5 long) together with the mottled pattern of pulverulence and long hind tarsal II (.42-.50, nearly twice as long as the long rostral IV, .24-.29). *C. palmerae* which is similar in color has tarsal II hardly longer than rostral IV.

Cinara medispinosa (Gillette and Palmer)

The Medium-haired Lodgepole Pine Aphid

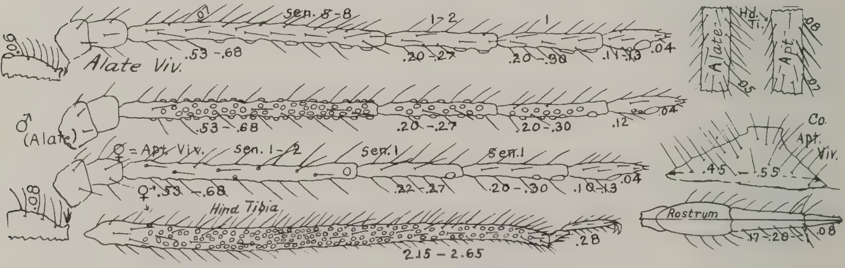

Fig. 28. *Cinara medispinosa*

Lachnus similis Gillette and Palmer, 1924:23 (preoccupied).
Lachnus medispinosus Gillette and Palmer, 1929a:30 (n.n. for similis); Knowlton, 1930:153.
Cinara medispinosa, Gillette and Palmer, 1931:859.

Fundatrix. Body 3.75 by 2; antenna 1.40. Otherwise as in summer apterous vivipara.

Apterous Summer Vivipara. Light cinnamon-brown to dark metallic brown with black as follows: Head, crossbands on thorax and abdominal I, broken dashes on remaining segments; slight powdery pattern on median line and lateral areas of thorax and abdominal IV; cornicle, tarsi, distal half to three-quarters of tibiae and entire antennal I, II and VI and tips of III, IV and V black. Body 3 by 1.60; antenna 1.50; hind tibia 2.15-2.70; hind tarsal II .28.

Hairs on hind tibia semispinelike to fine, shorter than diameter of tibia, numerous. Rostrum attaining middle of abdomen.

Alate Vivipara. Same as aptera in color and measurements or slightly smaller. Fore wing with media twice-forked. Hairs fine; on tibia slightly longer than diameter of tibia.

Ovipara. Apterous. Darker than vivipara and with abdomen posterior to cornicles pulverulent. Structural characters same as in apterous vivipara except hind tibia which is hardly swollen but covered with sensoria.

Male. Alate. Same as alate vivipara except as follows: Body length 2.50; hind tibia 1.90.

Egg. Newly-laid, light amber-brown; later, black; naked.

Collections. On *Pinus contorta* var. *murrayana* on bark of tender twigs and young branches. Colorado: Bellvue foothills, Laramie-Poudre Tunnel, Pingree Park and Tolland. Utah: Logan, Little Bear and Beaver Creeks. Idaho: Boise and Immigration Canyon Creek. Fundatrices May 9 to June 9, apterous summer viviparae May 31 to Sept. 16, alate viviparae May 31 to June 17, sexuales Oct. 2 to 19; common.

Type. U.S.N.M., No. 41961. Paratypes, Colo. Agr. Exp. Sta. Collection. Metatypes, Hille Ris Lambers Collection.

This species closely resembles *C. brevispinosa* and *C. murrayanae* from the same host, differing only in the length of the tibial hairs. Hairs on hind tibia in *brevispinosa* aptera .04 long, in alata .05; in *murrayanae* hairs in aptera and alata .10-.15 long; in *medispinosa* hairs in both alata and aptera .07-.08 long. That these differences are not accidental variations is indicated by the results of several breeding experiments with *brevispinosa* and *medispinosa,* involving 50 individuals in each species and in one case 6 generations (see Gillette and Palmer, 1924:29). Accordingly until further biological tests perhaps through the sexual cycle prove otherwise it seems safest to consider these forms distinct.

C. medispinosa resembles *C. villosa* and *C. pseudoschwarzii,* differing from the former as follows: length of tibial hairs (shorter than .11 in alata) and their slightly more sparse arrangement and more scanty pulverulence on body and from the latter in the more drooping tibial hairs. These differences are slight and even perhaps doubtful. Host transfer tests are needed to settle the question.

Cinara murrayanae (Gillette and Palmer)

The Long-haired Lodgepole Pine Aphid

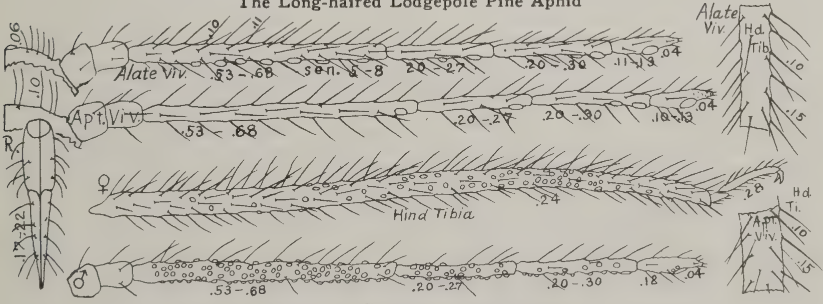

Fig. 29. *Cinara murrayanae*

Lachnus murrayanae Gillette and Palmer, 1924:26 and 29.
Cinara murrayanae, Gillette and Palmer, 1931:860.

Same in color and measurements as *C. medispinosa,* differing only in the hairs which are heavier, more erect and longer. Hairs on hind tibia somewhat longer than diameter of hind tibia in apterous vivipara and almost twice in alate vivipara.

Collections. On *Pinus contorta* var. *murrayana,* on bark of twigs and small branches. Colorado: Manassa and Bellvue foothills. Utah: Logan. Idaho: Boise. Fundatrices May 20, apterous summer viviparae June 3 to July 6, alate viviparae June 3, sexuales Oct. 2 to 9; rare.

Type. U.S.N.M., No. 41960. Paratypes, Colo. Agr. Exp. Sta. Collection.

The distinct status of this form in respect to *C. medispinosa* and *C. brevispinosa* is indicated by the fact that in breeding experiments (see discussion after the latter species descriptions) with said species no individuals appeared with the characters of *C. murrayanae.* All colonies of the latter, investigated so far, have been homogeneous as to form.

Cinara occidentalis (Davidson)

The Flocculent Fir Aphid (Plate II, 1-6)

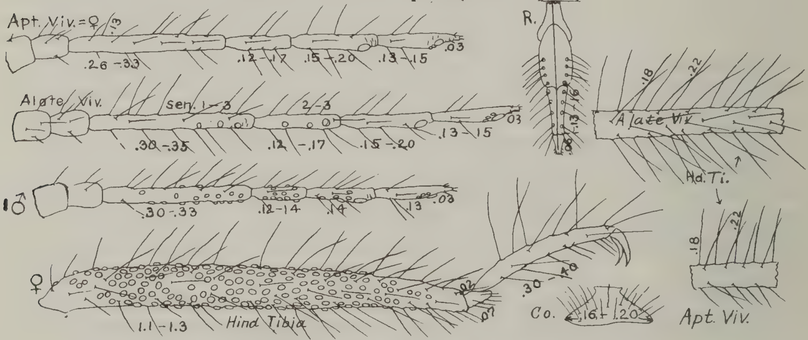

Fig. 30. *Cinara occidentalis*

Lachnus occidentalis Davidson, 1909:300; Wilson,, 1912a:193; Palmer, 1926:308.
Cinara occidentalis, Gillette and Palmer, 1931:861.

Fundatrix. Brownish olive-green; with 2 longitudinal rows of dark areas; covered with flocculent pulverulence; with cornicle dark and with appendages pale yellowish with black only on tip of antenna, extreme tips of tibiae and distal half of tarsi. Otherwise same as summer apterous vivipara.

Apterous Summer Vivipara. Light olive-green; pulverulent with cornicle greenish with black tip; appendages as in fundatrix. Body 2.5-3 by 1.5-2; hind tibia 1.1-1.3; hind tarsal II .32; antenna 1-1.1; rostrum attaining abdominal II. Ocular tubercle not evident. Hairs fine; on body .10, erect, fairly abundant; on hind tibia length 2-3 times diameter of tibia.

Alate Vivipara. Head and thorax cinnamon-brown to blackish; abdomen light olive-green; flocculent throughout; cornicles concolorous with abdomen but with black tips; appendages very pale yellowish brown; knees and distal half of tarsi blackish; tips of tibiae slightly brownish. Body 2; hind tibia 1.3; hind tarsal II .37. Hairs on hind tibia in length equalling 3 times diameter of tibia. Fore wing with media normally twice-forked but frequently once-forked and occasionally simple. Otherwise as in aptera.

Ovipara. Same as apterous vivipara except hind tibia, which is considerably swollen and bearing numerous sensoria on entire length.

Male. Alate. Similar to alate vivipara except size which is slightly smaller and antenna .90.

Egg. Newly laid, pale honey-yellow; later, black; slightly powdery. Size 1.2-1.3 by .5.

Collections. On *Abies lasiocarpa* and *A. concolor,* on bark of twigs, eggs laid singly on needles, usually only one to a needle. Colorado: Laramie-Poudre Tunnel, Rocky Mountain National Park and foot of Long's Peak. Utah: Big Cottonwood Canyon. Fundatrices May 20 to July 7, apterous summer viviparae June 14 to Sept. 16, alate viviparae June 10 to Sept. 16, sexuales Sept. 16 to Oct. 21; common.

Type. Possibly U.S.N.M.

Chief Distinguishing Characters. Rather light color of body and appendages and heavy flocculence, short legs, long erect hairs on appendages (3 times as long as diameter of segment bearing them), long hind tarsal II (about third of the length of hind tibia, as long as III), considerably swollen hind tibia of ovipara and short rostral IV (third of length of hind tarsal II).

Cinara oregonensis (Wilson)

The Pine Cone Aphid (Plate II, 7-12)

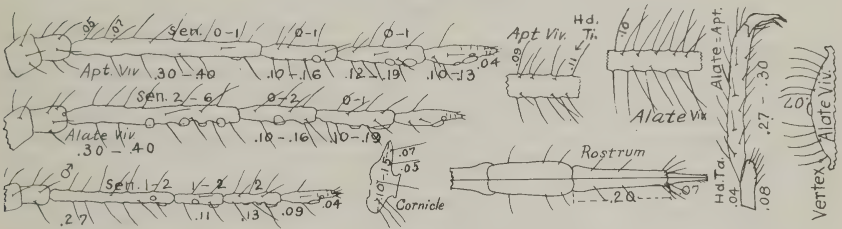

Fig. 31. *Cinara oregonensis*

Lachnus oregonensis Wilson, 1915a:103; Palmer, 1926:311.
Cinara oregonensis, Gillette and Palmer, 1931:862.

Fundatrix. Nymph. Newly hatched, deep flesh or cinnamon-rufous; head and two dorsolateral lines on pronotum and dorsum of abdominal III to VI dusky brown; slightly pulverulent; appendages dark. *Adult.* Brick-red to red-sienna; shining; marked with dusky dorsal dashes on last two thoracic and abdominal segments I, VII and VIII; slightly pulverulent; appendages yellow-brown to dusky; cornicle somewhat dusky. Measurements as in apterous summer vivipara.

Apterous Summer Vivipara. Nymph. Newborn, lemon-yellow, later, dusky yellow; slightly pulverulent. *Adult.* Light brick-red to ferruginous; shining; appendages pale to honey-yellow with knees, tips or distal two-thirds of length of tibiae, antennal VI and tips of III, IV and V, entire cornicle and tarsi dusky to blackish. Body length 2.5-3; hind tibia 1.6-2; antenna .80-1.00; rostrum attaining to end of abdomen or beyond. Hairs fine, fairly numerous, erect; on tibia, length 1.5 times diameter of tibia; on body .05-.07 long.

Alate Vivipara. Same in color and measurements as aptera.

Ovipara. Same as apterous summer vivipara, being distinguished from the latter only by the powdery tip covering dorsum of abdominal VII and VIII. Even the hind tibia shows no perceptible swelling or evident sensoria.

Male. Apterous. Head dusky; body brick-red to brownish red; powdery; appendages dusky. Body length 1.50; antenna .70; rostrum about 1.5 times length of body. Hairs on hind tibia rather sparse, .07 in length, twice as long as diameter of tibia.

Egg. Light yellowish brown or honey-yellow when first laid, later black and shining. Size 1.5 by .5.

Collections. On *Pinus contorta* var. *murrayana,* rarely on *Pinus ponderosa* var. *scopulorum,* on young cones, the second generation nearly all acquiring wings and migrating to newly developed cones where sexuales develop and eggs are laid on underside and at bases of scales of cones. Colorado: Eldora, Bellvue foothills and Rocky Mountain National Park. Utah: Logan Canyon. Fundatrices May 13 (reared from eggs taken April 22), apterous summer viviparae June 16 to September 10 on same cones as fundatrices, alate viviparae June 5 to 25, sexuales Sept. 15 to Oct. 2 on new cones, eggs on new cones Sept. 26 to April 22; apparently rare but abundant where occurring. Difficult to detect on account of the protective coloration unless their presence is betrayed by the attendant ants.

Chief Distinguishing Characters. Habitat (among the scales of the cone), red-brown body, length of rostral IV (.2) and length of tibial hairs (.09-.11, in aptera 1.5 times length of diameter of tibia).

Cinara osborni Knowlton

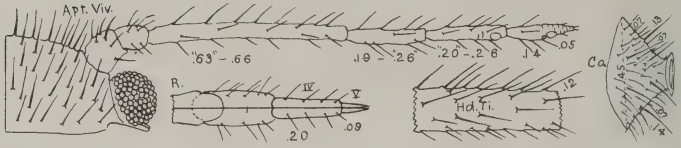

Fig. 32. *Cinara osborni*

Cinara osborni Knowlton, 1942b:7.

Apterous Summer Vivipara. (Mounted in balsam), legs pale except tarsi and tips of tibiae which are black; antenna pale except I and II and tips of III, IV and V and distal two-thirds of VI which are dusky, as are also the terminal segments of the rostrum. Body 3.5-4; across eyes .85-.95; hind tibia 2.53; hind tarsal II .45; rostrum attaining middle of abdomen. Hairs moderately heavy and spinelike; abundant on body, on lateral portions .08-.095 long; on cornicle a few long spinelike hairs and more numerous fine shorter ones.

Collections. On *Pseudotsuga taxifolia.* Utah: Aspen Grove and Mount Timpanogos. Apterous viviparae June 30; rare.

Type. Knowlton Collection.

Chief Distinguishing Characters. Length of hairs on cornicle (fine ones .07 long; heavy, spinelike ones .13-.14), eyes sessile, ocular tubercle well developed, length of rostral IV (.20), length of hind tibial hairs (.12), color of hind tibia (mostly pale), length of hind tarsal II (.35) and length of body (3.5-4).

Cinara palmerae (Gillette)

The Spotted Spruce Aphid

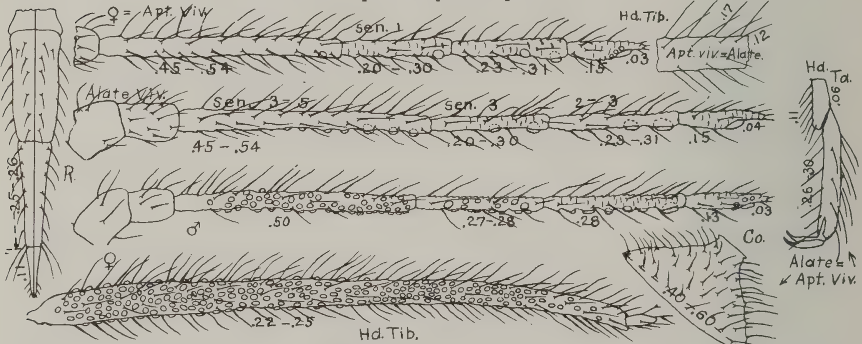

Fig. 33. *Cinara palmerae*

Lachnus palmerae Gillette, 1917a:135.
Cinara palmerae, Gillette and Palmer, 1931:863.

Fundatrix. Nymph. 1st instar, ashy gray due to pattern of pulverulence. *Adult.* Same as apterous summer vivipara.

Apterous Summer Vivipara. Dark brown to blackish; with broken pattern of pulverulence, heavier laterally except on abdominal I; entire antennal I, II and VI and tips of IV and V, coxae, knees, tarsi and tips of tibiae, rostrum, cauda, anal and genital plates black or blackish. Cleared specimens with a few scattered dark areas at hair bases. Body length 3.5-4; hind tibia 2.2-2.5; hind tarsal II .26-.30; antenna 1.3-1.5; rostrum surpassing cornicles. Hairs fine; on hind tibia, length over 1.5 times diameter of tibia.

Alate Vivipara. Same in color and measurements as aptera. Tibial hairs about twice as long as diameter of tibia. Fore wing with media twice forked.

Ovipara. Apterous. Similar to fundatrix, differing as follows: powdery white markings much heavier, with head and entire dorsum of abdomen posterior to cornicles covered with white powder and hind tibia slightly swollen on proximal third to half and thickly covered with sensoria throughout entire length.

Male. Alate. Body 2.3 long; other characters similar to alate vivipara except antenna, as shown in figure.

Egg. Newly laid, yellowish brown; later, black; covered with pulverulence taken from her body and placed there by the hind tarsi of the ovipara. Length 1.30.

Collections. On *Picea pungens* and rarely on *P. engelmanni,* on bark of twigs and small limbs, in large colonies, eggs mostly on bark of twigs at bases of needles, a few on needles. Colorado: Fort Collins, Paonia and Tolland. Utah: Smithfield and Logan. Fundatrices Mar. 16 to May 20, apterous summer viviparae May 16 to July 20, alate viviparae May 5 to Nov. 5, sexuales Oct. 6 to Nov. 5; common in parks.

Type. U.S.N.M., No. 41942. Paratypes, Colo. Agr. Exp. Sta. Collection. Metatypes, Hille Ris Lambers Collection.

Chief Distinguishing Characters. Color pattern, long hairs (on tibia .12-.17), rather long rostral IV (.25-.26) and large cornicle (.40-.60 in diameter at base).

Metatype specimens of *C. bogdanowi* (Mordvilko) are very close but differ as follows: Shorter tibial hairs (.07-.10 instead of .10-.17), longer rostral IV (.27-.30 instead of .25-.26), longer hind tarsal II (.33-.35 instead of .26-.30) and location of eggs on old bark according to Cholodkovsky (1896c:148 in description of *Cinara piceicola).*

Cinara piceicola (Cholodkovsky)

The Dark Brown Spruce Aphid

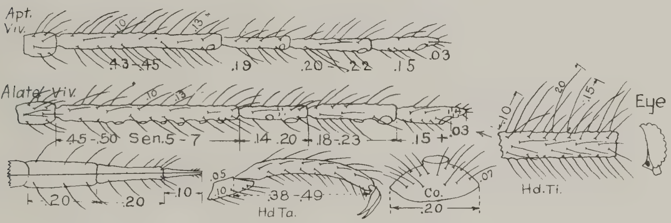

Fig. 34. *Cinara piceicola*

Lachnus piceicola Cholodkovsky, 1896c:148 and 1898:659.
Cinara piceicola, Palmer, 1945:447.

Fundatrix. "Dark brown to reddish gray with greenish tinge; slightly pulverulent."

Apterous Vivipara. "Much lighter in color than fundatrix, grayish yellow with black specks; some examples greenish." Antenna except VI and distal half of V and tip of IV and legs except tarsi and tips of tibiae pale yellowish; cornicle, cauda, tarsi and tips of tibiae and of rostrum dark. Body length 3; across eyes .70-.73; antenna 1.20; hind tibia 2.

Alate Vivipara. Head and thorax dusky to blackish; "abdomen same as apterous vivipara excepting for some individuals which are greenish and with two dark green longitudinal dorsolateral stripes." Appendages as in apterous vivipara. Length of body 3; antenna about 1.20; hind tibia 1.55-1.80; rostrum attaining cornicle. Hairs fine; on antenna length 2-3 times diameter of III; on hind tibia length 1.5-2 times diameter of tibia. Eye with tubercle.

Ovipara. "Light brown to yellowish; naked except for white flocculence posterior to cornicle. Body length 2.5. Hind tibia somewhat swollen."

Male. "Apterous. Dark green with two black longitudinal dorsal stripes. Body length 2; antenna 1.1, bearing numerous sensoria."

Egg. "Newly laid, yellow; later, black; often somewhat pulverulent."

Collections. On last year's bark of *Picea excelsa.* Colorado: Denver. Alate and apterous viviparae April 9; not common.

Data for description and for figures were taken from metatype specimens contributed by Cholodkovsky and from his description.

Chief Distinguishing Characters. Grayish yellow body with only slight pulverulence, long hairs on appendages, length of rostral IV (about the same as V) and long hind tarsal II (the same length as III).

Cinara pinea (Mordvilko)

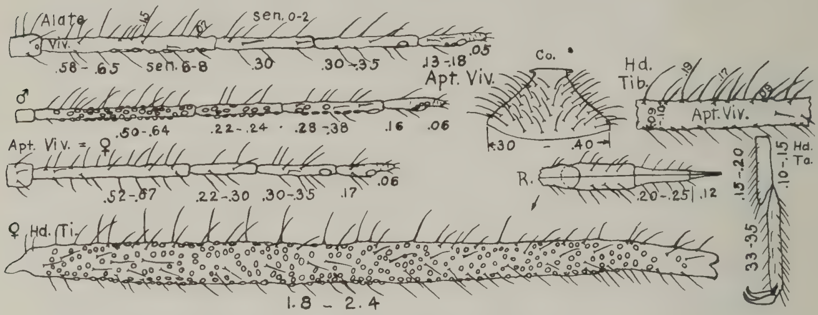

Fig. 35. *Cinara pinea*

Lachnus pineti Fabricius (misidentification), Koch, 1855:230.
Lachnus pineus Mordvilko, 1894 (1895):126; Cholodkovsky, 1898:635.

Apterous Summer Vivipara. (Mounted on slide), head and pro- and mesothorax dusky; metathorax and abdomen covered with irregular black areas at bases of hairs; antennal segments dusky distally; cauda, cornicle, anal plate, femora, tibiae and distal half or more of rostrum, entire tarsi and knees blackish. Body length 2.5-4.5; antenna 1.40-1.60; hind tibia 2-3; rostrum attaining beyond cornicle. Hairs on hind tibia spinelike, the longest nearly 1.75 times as long as diameter of tibia.

Alate Vivipara. Same as aptera or darker. Fore wing with media faint and twice-branched. Hairs on hind tibia .19-.22, at most 2.5 times as long as diameter of tibia.

Male. Alate. Dusky to black on body and appendages; abdomen with darker areas at bases of hairs. Otherwise same as alate vivipara except antenna as shown in figure.

Ovipara. Same as apterous vivipara except hind tibia which is slightly swollen for nearly entire length and covered throughout with sensoria.

Collections. On *Pinus sylvestris* and *Pinus nigra.* Utah: Logan. Apterous vivipara June 5 to Oct. 5, sexuales Sept. 9 and Nov. 4.

[Genotype *Cinara pini* (Linnaeus)]

Aphis pini Linnaeus, 1758:453.
Aphis nudi-pini de Geer, 1773:27.
Lachnus nudus Mordvilko, 1895 (1894):642.
Eulachnus pini Del Guercio, 1909a:339.
Cinara pini, Börner, 1930:123 and 162.

(Not described or figured on account of unavailability at present of type specimens of *C. nuda* Mordvilko, the only possible existent types.) (Not taken in this region.)

Cinara ponderosae (Williams)

The Golden Pine Aphid

Lachnus ponderosae Williams, 1910:22; Davis, 1911b:5.
Cinara ponderosae, Gillette and Palmer, 1931:864.

Fundatrix. Same as apterous summer vivipara.

Apterous Vivipara. Shining metallic golden-brown; with tendency to a pair of dorsal and lateral rows of black areas on thorax and abdominal I, II and VII and band on VIII; marked with powder on broken median line, intersegmental lines and lateral areas throughout except on abdominal I, II and III; antenna yellow except I, II, tips of III and IV and entire V and VI; legs mostly black, yellow from below knees to about middle of tibia; cornicle black. Body length 2.5-4; hind tibia 2-2.75; antenna 1.17; rostrum surpassing middle of abdomen. Hairs on hind tibia spinelike, rather sparse, slightly shorter than diameter of tibia; on body same as on tibia.

Alate Vivipara. Same as aptera except as follows: Pulverulence more complete on lateral part of abdomen. Hairs on hind tibia .05-.07, slightly longer than diameter of tibia. Fore wing with media usually twice-forked, rarely once-forked.

Ovipara. Same as vivipara except abdominal segments posterior to cornicles rather heavily covered with pulverulence, especially laterally; hind tibia almost entirely black, slightly swollen on proximal half and covered throughout with sensoria.

Male. Alate. Similar to alate vivipara except antenna, as figured.

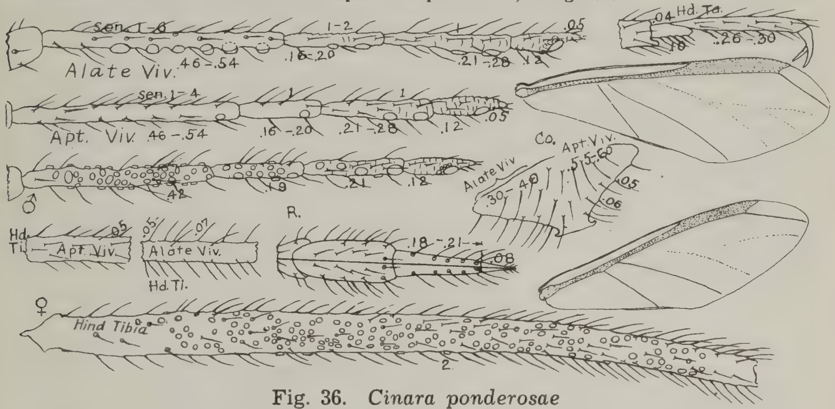

Fig. 36. *Cinara ponderosae*

Collection. On *Pinus ponderosa* var. *scopulorum,* on bark of twigs and small branches; in large colonies; eggs laid on needles. Colorado: Generally. Utah: Beaver Creek Canyon and Logan Canyon. Fundatrices Mar. 19 to May 2, apterous summer viviparae Apr. 11 to Oct. 10, alate viviparae Apr. 11 to Oct. 9, sexuales Oct. 7 to Nov. 25; very common.

Cotypes. U.S.N.M., No. 78 and University of Nebraska Collection, No. 24.

Chief Distinguishing Characters. Shining metallic golden brown body with broken pattern of pulverulence, character of the hairs, especially on hind tibia (rather sparse, spinelike .05-.07) and length of rostral IV (.18-.21).

Cinara pseudoschwarzii Palmer

The Medium-haired Mottled Pine Aphid

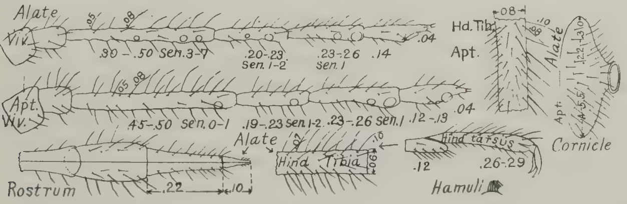

Fig. 37. *Cinara pseudoschwarzii*

Cinara pseudoschwarzii Palmer, 1936a:274.

Fundatrix. Brownish black to dull black with median line of whitish spots. Measurements same as summer apterous vivipara except body may be slightly larger and appendages may sometimes be somewhat shorter.

Apterous Summer Vivipara. Brownish black to dull black, marked with broken and indefinite pattern of white; antenna pale except tips of III, IV and V and entire VI; legs and cornicle black but legs with yellowish area just beyond knees. Length of body 3.3-4; antenna 1.2-1.3; hind tibia 1.90-2.4; hairs on hind tibia as long as diameter of tibia. Otherwise as in alate vivipara except as figured.

Alate Vivipara. Head and thorax dull black; abdomen blackish brown to dull black, marked with broken lines of white secretion on margins of sclerites of thorax and on the abdomen on median line, lateral areas and dorsum of posterior segments; antenna black except proximally on III, IV and V; cornicle black; legs black except yellowish portion just beyond knees. Length of body 3.8-4; across eyes .72; antenna 1.2; hind tibia 2-2.4. Hairs on hind tibia moderately fine, nearly erect.

Collections. On bark of terminal twigs of *Pinus ponderosa* var. *scopulorum.* Colorado: Foothills near Boulder. Fundatrices May 2, apterous and alate viviparae May 20 to July 8; rare.

Type. U.S.N.M., No. 51417. Paratypes, Colo. Agr. Exp. Sta. and Hille Ris Lambers Collections.

Acknowledgements are due to L. F. Byars who collected the specimens and contributed them to the collection.

Chief Distinguishing Characters. Character of the hairs on appendages (nearly erect, fine, .05-.08 on III and .07-.10 on hind tibia), length of III (not longer than .50, shorter than 3 times rostral IV) and length of rostral IV (.22).

Cinara pseudotaxifoliae n. sp.

(Plate I, 8-15)

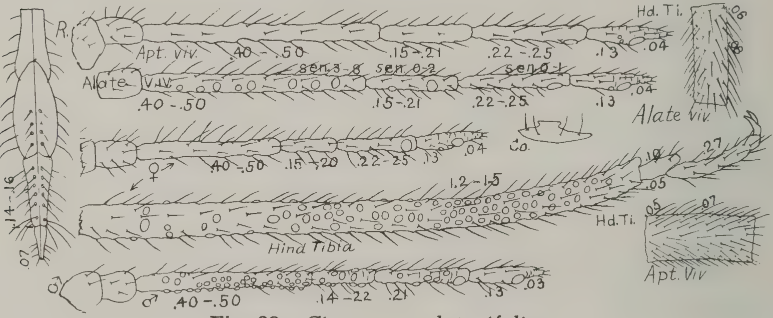

Fig. 38. *Cinara pseudotaxifoliae*

Lachnus taxifoliae Swain (misidentification), Palmer, 1926:304.
Cinara taxifoliae (misidentification), Gillette and Palmer, 1931:872.

Fundatrix. Same as apterous summer vivipara except in color; pulverulent pattern may be more or less lacking in older specimens and antenna and hind tibia may be slightly shorter.

Apterous Summer Vivipara. Nymph. Pale brownish yellow with two longitudinal rows of green spots; somewhat powdery on head and median and intersegmental lines; legs brownish yellow to dusky. *Adult.* Dark brown to blackish, becoming yellowish brown on median line; pulverulence entirely covering head, prothorax and lateral portions of thoracic segments and abdominal II and IV; appendages brownish yellow, with tarsi, knees and almost entire hind tibia dusky to black; cornicle black. Body 3 by 1.5-3.5 by 2; hind tibia 2-2.5; hind tarsal II .27; antenna 1.1-1.4; cornicle mere rim .01 in height without perceptible cone-shaped base though a small surrounding area may be darkened; rostrum attaining abdominal I. Hairs on hind tibia fine, numerous, at 35 degrees, length less than diameter of tibia; on body .06 and moderately numerous.

Alate Vivipara. Head and thorax dark brown; abdomen amber to dusky brown; pulverulent on median and intersegmental lines and lateral areas. Measurements about same as in aptera. Hairs on tibia same length as in aptera but same length as diameter of tibia. Fore wing with media twice-forked.

Ovipara. Color similar to apterous vivipara except abdomen posterior to cornicles heavily pulverulent. Size somewhat smaller, body length 2.5; hind tibia with sensoria scattered along almost entire length.

Male. Alate. Color as in alate vivipara. Body length 2; hind tibia 1.5.

Egg. Black; covered with light pulverulence. Size 1 by .50.

Collections. On *Pseudotsuga taxifolia*, on bark of twigs, in colonies; eggs on needles laid lengthwise 1-3 together in a row. Colorado: Foothills in Larimer

Co. Utah: Aspen Grove, Mount Timpanogos, and Logan Canyon. Idaho: Emigration Canyon. Fundatrices May 15 to June 26, apterous summer viviparae June 8 to Aug. 26, alate viviparae June 20 to July 26, sexuales Sept. 12 to Oct. 10, oviparae until Nov. 10; quite common.

Type. U.S.N.M., No. 59322. Paratypes, Colo. Agr. Exp. Sta. and Essig Collections.

Chief Distinguishing Characters. Rudimentary cornicle bases, short, drooping, numerous tibial hairs, length of rostral IV (.16) and dark brown body without median pale area.

This species differs from the original description of *Lachnus taxifoliae* Swain as follows: Length of body (greater than "2-2.08"), length of antennal segments (greater than the following: "III .23-.30, IV .10-.137, V .11-.146, VI .09-.12") and length of hind tarsal II (greater than .21). Swain does not mention length of hairs. Swain's cotypes (all that could be located) fail to agree with his description. *C. pseudotaxifoliae* differs from the above-mentioned cotypes as follows: Length of hind tarsal II (shorter than ".32-.34"), numerous short, drooping hairs on the hind tibia and length of tibial hairs (only half of .12-.15).

Cinara pseudotsugae (Wilson)

(Plate I, 1-7)

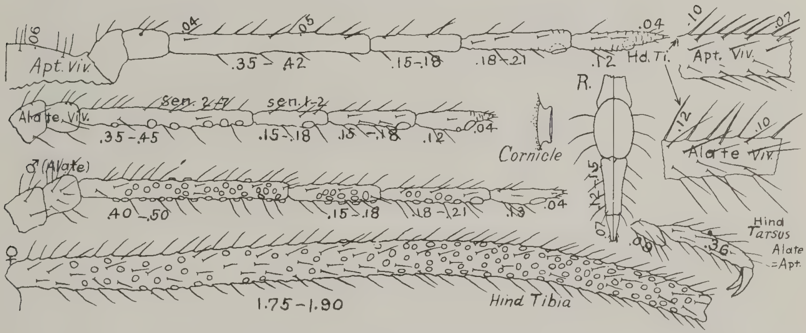

Fig. 39. *Cinara pseudotsugae*

Lachnus pseudotsugae Wilson, 1912b:302; Palmer, 1926:301.
Cinara pseudotsugae, Gillette and Palmer, 1931:865.

Fundatrix. Color as in summer vivipara or darker. Body length 3-3.5, robust; hind tibia 1.9; otherwise as in apterous summer vivipara.

Apterous Summer Vivipara. Pale translucent brown shading to whitish on mediodorsum of first four abdominal segments, a pair of dusky areas on all thoracic segments and abdominal I; slight powder on lateral areas of thoracic segments and abdominal IV and on most intersegmental lines; appendages pale yellowish with brownish on distal third to half of hind tibia and on entire tarsi. Older individuals darker and without evident powder. Body 3 by 2; hind tibia 2; antenna 1-1.1; cornicle hardly more than mere rim, mammiform base rudimentary or absent. Hairs semispinelike, somewhat sparse; on hind tibia length hardly equalling diameter of tibia. Rostrum attaining 2d or 3d coxa.

Alate Vivipara. Same as aptera or with trace of greenish in two dorsolateral stripes; head and thorax brown. Hairs on hind tibia with length equalling 1-1.5 times diameter of tibia; on body finer, .04-.05 long; fore wing with media twice-branched.

Ovipara. Same as apterous vivipara except abdomen posterior to cornicles where it is heavily pulverulent and hind tibia which though hardly swollen bears numerous sensoria.

Male. Alate. Same as alate vivipara or abdomen pale sordid green with two darker green dorsolateral stripes. Body length 2.5; hind tibia 1.6. Otherwise similar to alate vivipara.

Egg. Black, with slight powder.

Collections. On *Pseudotsuga taxifolia,* on bark of twigs; eggs laid end to end lengthwise on upperside of needles, in rows of two or three on a needle. Colorado: Glen Haven, foothills near Bellvue, Rocky Mountain National Park and Pingree Park. Fundatrices June 3 to 27, apterous summer viviparae June 16 to July 6 and Sept. 1, alate viviparae June 20 to Sept. 26, sexuales Sept. 8 to 27; not common.

Type. Granovsky Collection.

Chief Distinguishing Characters. Character of the cornicle (a mere rim with hardly noticeable base) and moderately spinelike and not very numerous tibial hairs.

Cinara pulverulens (Gillette and Palmer)

The Powdery Juniper Aphid

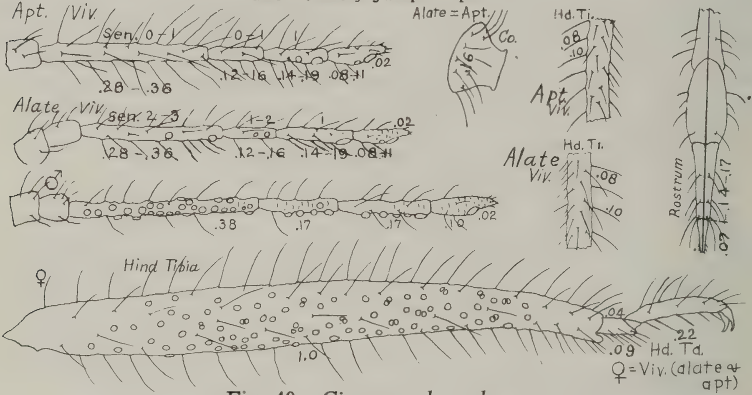

Fig. 40. *Cinara pulverulens*

Lachnus pulverulens Gillette and Palmer, 1924:40.
Lachnus burrilli Wilson, Knowlton, 1930:158 (misidentification).
Cinara pulverulens, Gillette and Palmer, 1931:866.

Apterous Summer Vivipara. Yellowish brown, with a pair of longitudinal rows of black areas vanishing posteriorly; heavily pulverulent throughout except on black areas; cornicle black; tibiae mostly yellow, only tips and tarsi black; antenna yellow with V and VI blackish. Body length 2.2-2.9, robust; hind tibia 1.2-1.5; hind tarsal II .22; antenna .95; rostrum attaining abdomen. Hairs fine, rather numerous, on hind tibia, length equalling or slightly exceeding diameter of tibia.

Alate Vivipara. Head and thorax dark brown. Other parts same color as aptera. Body length 2; hind tibia .90; antenna .80. Fore wing with media twice-branched. Hairs on hind tibia with length barely twice the diameter of tibia. Otherwise same as aptera.

Ovipara. Same as apterous vivipara except hind tibia which is dark throughout, swollen and bearing sensoria.

Male. Alate. Similar to alate vivipara except antenna, as figured.

Collections. On *Juniperus scopulorum* and *J. utahensis,* on bark of twigs. Colorado: Fort Collins, Laramie-Poudre Tunnel, Masonville, Estes Park, Big Thompson Canyon and Colorado Springs. Utah: Smithfield Canyon, Providence Canyon and Logan. Alate viviparae Mar. 22 and Aug. 1 and 22, apterous viviparae Mar. 22 and Aug. 1 to Sept. 31, oviparae Sept. 29 to Oct. 17, males Sept. 29; quite rare.

Type. U.S.N.M., No. 42812. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Heavy pulverulence throughout with absence of any black bands, moderately long tibial hairs (.08-.10 long) and small cornicle (.15 in diameter at base of cone).

Cinara sabinae (Gillette and Palmer)

The Rocky Mountain Juniper Aphid

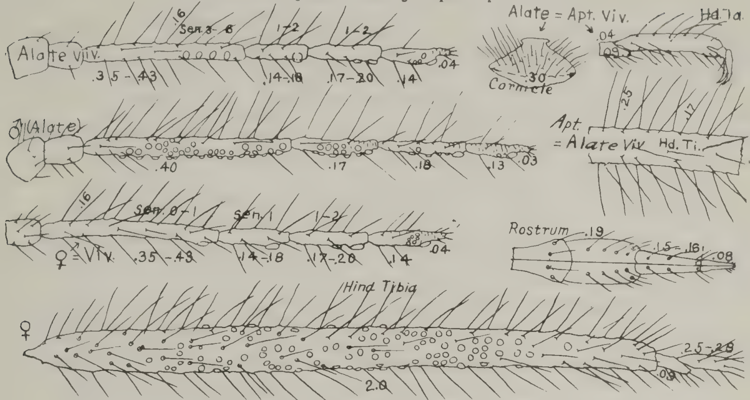

Fig. 41. *Cinara sabinae*

Lachnus sabinae Gillette and Palmer, 1924:9.
Cinara sabinae, Gillette and Palmer, 1931:867.

Fundatrix and Apterous Summer Vivipara. Light yellowish brown, marked with dark brown to black on lateral areas, pair of dorsal areas on thorax, solid bands on abdominal V and VI and median of IV; heavily pulverulent in crossbands, leaving only dark marking exposed; cornicle black; legs mostly pale. Color pattern blending with color of bark on which they rest. Body 3.1 long; hind tibia 1.4-1.8; hind tarsal II .25-.28; antenna 1.1; rostrum surpassing 3d coxa. Hairs on hind tibia moderately stout, numerous, length fully twice diameter of tibia; on body .16 long.

Alate Vivipara. Same as aptera or slightly larger, except as figured. Fore wing with media twice-branched.

Ovipara. Similar to apterous vivipara but somewhat larger, and hind tibia moderately swollen and with sensoria.

Male. Alate. Same as alate vivipara except size smaller and color darker and with pulverulence tending to more distinct bands and sensoria on antenna, as figured.

Egg. Shining black; without powder. Size 1 by .50.

Collections. On *Juniperus scopulorum*, on bark of twigs, in large colonies; eggs laid on the needles, singly or in rows of 2 or 3, few on bark of small twigs. Colorado: Fort Collins, Longmont, Denver, and Big Thompson Canyon. Wyoming: Cheyenne. Utah: Logan. Fundatrices April 9 to May 23, apterous summer viviparae Aug. 10 to Sept. 31, alate viviparae Aug. 10 to Sept. 24, sexuales Oct. 6 to Nov. 7; common, often in injurious numbers, killing twigs.

Type. U.S.N.M., No. 41954. Paratypes, Colo. Agr. Exp. Sta. Collection. Metatypes, Hille Ris Lambers Collection.

Chief Distinguishing Characters. Long, erect hairs (on tibia .22 long, length fully twice diameter of tibia) and color pattern of body.

Cinara schwarzii (Wilson)

The Short-haired Mottled Ponderosa Pine Aphid

Lachnus pini Linnaeus (misidentification), Cowen (in Gillette and Baker), 1895:117.
Lachniella schwarzii Wilson, 1919b:46.
Lachnus schwarzii, Palmer, 1926:319.
Cinara schwarzii, Gillette and Palmer, 1931:868.

Fundatrix. Same as apterous summer vivipara except as follows: antenna 1-1.2; hind tibia 1.6-1.9; hind tarsal II .23-.28.

Apterous Summer Vivipara. Cinnamon-brown; mottled and speckled with black, or entirely black; with scattered patches and streaks of pulverulence, especially on median line; legs black except area, about one-quarter of length, below knees yellow; cornicle black; antenna yellow except tips of III, IV and V and entire VI black. Body length 3-4; hind tibia

2.1-3; antenna 1.2-1.6; rostrum attaining middle of abdomen. Hairs fine; on hind tibia numerous, length less than diameter of tibia. *Young.* Newborn, straw-yellow with colorless appendages.

Alate Vivipara. Same as aptera except as follows: Secondary sensoria rather large, often irregular in size, somewhat tuberculate; hairs on hind tibia .05-.07 long, length about equal to diameter of tibia. Fore wing with media twice-branched.

Male. Alate. Similar to alate vivipara, but somewhat smaller in all measurements and sensoria present on antenna, as figured.

Ovipara. Same as apterous vivipara except body length which is 3-5 and hind tibia which bears sensoria as figured.

Egg. Black, naked; size 1 by .47.

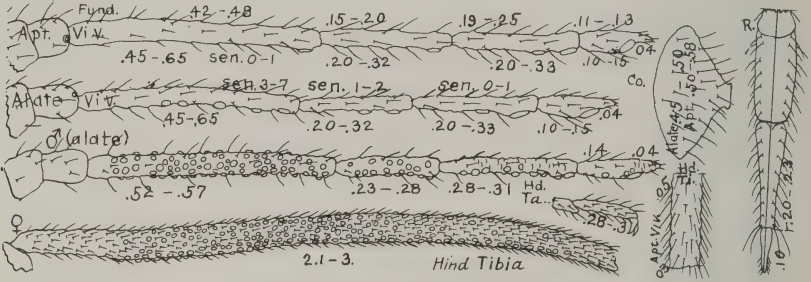

Fig. 42. *Cinara schwarzii*

Collections. On *Pinus ponderosa* var. *scopulorum,* on bark of twigs and small branches, in colonies; eggs laid on needles in rows, end to end, lengthwise of the needle. Colorado: Generally. Utah: Mount Nebo and Beaver Canyon. Fundatrices Apr. 8 to May 18, apterous summer viviparae June 18 to Nov. 8, alate viviparae June 18 to Oct. 7, sexuales Oct. 9 to 27; very common.

Type. U.S.N.M.

Chief Distinguishing Characters. Short numerous drooping tibial hairs, brown to black body, absence of orange color in legs and straw-yellow color of newborn young.

Cinara sibiricae (Gillette and Palmer)

The American Juniper Aphid

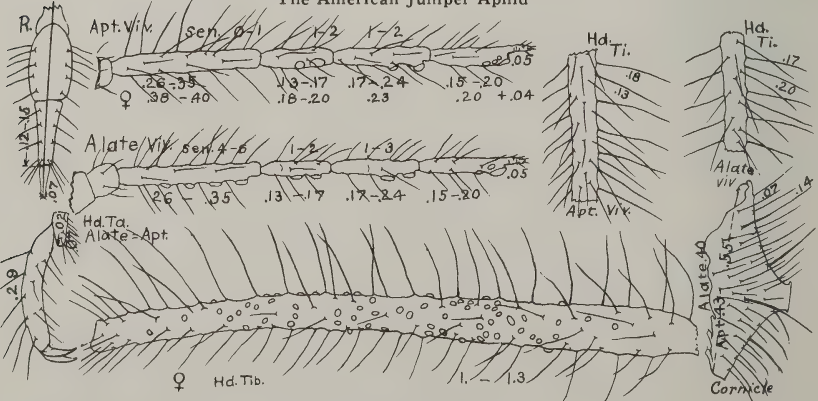

Fig. 43. *Cinara sibiricae*

Lachnus sibericae Gillette and Palmer, 1924:12 (misspelling for *sibiricae*).
Cinara sibiricae, Gillette and Palmer, 1931:869.

Fundatrix. Same as apterous summer vivipara except usually with pulverulence more or less rubbed off and antenna and hind tibia 1 long.

Apterous Summer Vivipara. Color pinkish cinnamon-brown appearing white due to pulverulence, leaving naked only two longitudinal rows of black spots and the black mammiform cornicle bases; legs dusky throughout. Body 2.60-3 by 1.75-2.25; hind tibia 1-1.2; antenna 1-1.1; rostrum attaining 3d coxa. Hairs rather fine; on hind tibia the longest twice as long as the diameter of tibia; on cornicle of two lengths.

Alate Vivipara. Same in color and measurements as aptera. Hairs on hind tibia with length three times diameter of tibia. Fore wing with media once-branched.

Ovipara. Apterous. Color and measurements same as apterous summer vivipara except powder more sparse and confined to intersegmental lines. Hind tibia somewhat swollen and bearing scattered sensoria along almost entire length.

Male. Apterous. Color same as apterous vivipara except powder mostly confined to intersegmental lines (specimen may have been rubbed, only 1 taken). Body 1.83 by 1 and antenna about 1.

Egg. Shiny black.

Collections. On *Juniperus communis* var. *montana* on bark of twigs, solitary; eggs laid on pubescent side of needles. Colorado: Wherever the host occurs. Fundatrices June 2 to July 7, apterous viviparae June 13 to Aug. 27, alate viviparae June 9 to 13, oviparae Oct. 9, apterous male (a single individual) Sept. 11; rather common but difficult to find on account of its solitary habit.

Type. U.S.N.M., No. 41955. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Long tibial hairs, large cornicle not covered by powder and bearing two lengths of hairs and relatively short rostral IV.

This species is very close to *C. juniperi* (De Geer) but De Geer's description gives the following differences: Occurrence in large colonies and hairs very short on body and appendages. In *C. sibiricae* occurrence is solitary and the hairs are long.

Cinara solitaria (Gillette and Palmer)

The Ponderosa Pine Tip Aphid

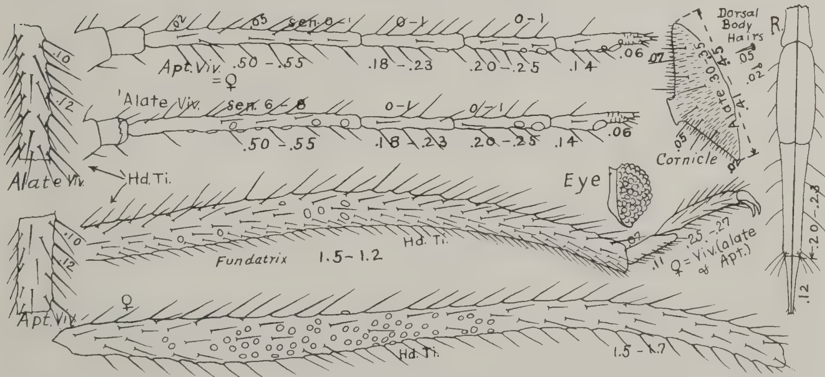

Fig. 44. *Cinara solitaria*

Lachnus solitarius Gillette and Palmer, 1924:17.
Cinara solitaria, Gillette and Palmer, 1931:870.

Fundatrix. Same as apterous summer vivipara except less yellowish on abdomen and antenna slightly shorter, 1.1-1.3 and a few sensoria on hind tibia, as figured.

Apterous Summer Vivipara. Dull dusky brown or greenish to yellow-brown, with six longitudinal rows of black dots; slightly powdery; antenna, except III and proximal half of

IV (which are yellow-brown) and entire tibiae black; femora, except tips, brownish yellow. Body 2.5-3 by 2, robust and spiderlike or ticklike in appearance; hind tibia 1.5-1.7; hind tarsal II .27; antenna 1.3-1.5; rostrum attaining cornicles. Hairs on hind tibia heavy, spinelike, rather numerous, length about equalling diameter of tibia; hairs on ventral side of tibia finer and shorter, on body .02-.05 long; on cornicle some spinelike, sparse, others very fine and numerous. Ocular tubercle small or absent. *Young Nymph.* Brownish yellow on abdomen, paler on thorax, dusky brown on head; bases of hairs dusky; legs colorless, with tips of segments and entire tarsi blackish.

Alate Vivipara. Same as aptera except hairs on hind tibia with length 1.5-2 times the diameter of tibia. Fore wing with media twice-forked.

Ovipara. Same as apterous vivipara except hind tibia, as figured.

Collections. On *Pinus ponderosa* var. *scopulorum,* on bark of tender tips standing head downward at bases of needles, solitary, ticklike in appearance and action. Colorado: Foothills near Fort Collins, Bellvue and Estes Park. Utah: Bryce Canyon and South Long Valley. Fundatrices Apr. 10 to June 12, apterous summer viviparae June 16 to Aug. 21, alate viviparae June 20, oviparae Oct. 1 and 2; rather common but seldom noticed on account of solitary habit and head down position among the needles.

Type. U.S.N.M., No. 41957. Paratypes, Colo. Agr. Exp. Sta. Collection. Metatypes, Hille Ris Lambers Collection.

Chief Distinguishing Characters. Ticklike general appearance, hardly noticeable ocular tubercle, two strikingly different kinds of hairs on cornicle and length of rostral IV (.20-.23).

Cinara splendens (Gillette and Palmer)

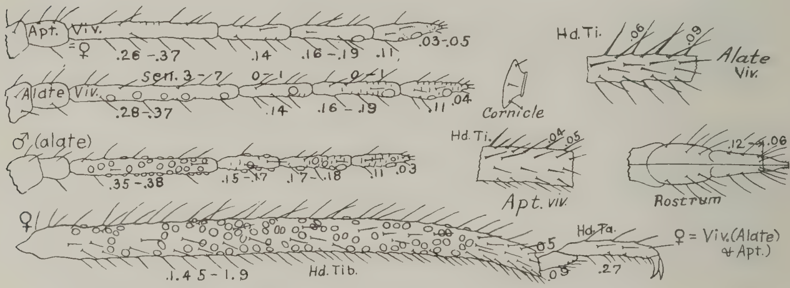

Fig. 45. *Cinara splendens*

Lachnus splendens Gillette and Palmer, 1924:14.
Cinara splendens, Gillette and Palmer, 1931:871.

Fundatrix. Light to dark rusty-brown with a pair of blackish areas on 2d and 3d thoracic segments and abdominal I and VIII; slight pulverulence on head, sides of thorax and on intersegmental lines of abdomen, otherwise as in apterous summer vivipara.

Apterous Summer Vivipara. Nymph. Greenish to water-white with 2 longitudinal rows of green to black areas. *Adult.* Rusty brown with pale area on median of abdominal I, II and III; with slight pulverulence on head, lateral areas and intersegmental lines; cornicle black; legs yellowish or colorless except tarsi and extreme tips of tibiae which are blackish. Body length 2.2-2.6; hind tibia 1.25-1.65; hind tarsal II .27; antenna .9-1.1; cornicle with base hardly raised, .07 in diameter, sometimes only rim .05 in diameter evident; rostrum attaining abdominal III. Hairs on tibia rather stout, nearly sparse, length hardly equal to diameter of tibia.

Alate Vivipara. Head and thorax yellowish to rusty brown; abdomen pale rusty yellow, paler on median anterior and posterior segments; powdery on head and thorax and intersegmental lines of abdomen; legs pale with only tarsi and extreme tips of tibiae blackish. Measurements same as in aptera. Hairs on hind tibia with length equalling or surpassing diameter of tibia. Fore wing with media twice-branched. Otherwise as in aptera.

Ovipara. Same as apterous vivipara except abdomen posterior to cornicles heavily pulverulent and hind tibia slightly swollen and bearing scattered sensoria throughout nearly entire length.

Male. Alate. Color similar to alate vivipara or abdomen more greenish; size slightly smaller; antenna .90; hind tibia .92.

Egg. Newly laid, honey-yellow; later, black; shining.

Collections. On *Pseudotsuga taxifolia*, on bark of twigs; in colonies; eggs laid lengthwise on needles. Colorado: Estes Park, Bellvue, Pingree Park, Laramie-Poudre Tunnel and Colorado Springs. Fundatrices May 22 and 28, apterous summer viviparae June 5 to Sept. 5, alate viviparae June 5 to 20, sexuales Sept. 8 to Nov. 25; fairly common.

Type. U.S.N.M., No. 41956. Paratypes, Colo. Agr. Exp. Sta. and Hille Ris Lambers Collections.

Chief Distinguishing Characters. Absence of black or definite mammiform base for cornicle, tibiae pale with only extreme tips blackish, body length (2.2-2.6) and length of tibial hairs in alate vivipara (.05-.08). The three latter points separate this form from C. *pseudotsugae* in which distal third to half of hind tibia is blackish, body is 3 long and tibial hairs .07-.12 in alate vivipara.

The constancy of these characters was indicated by the results of experiments in which several colonies of the latter species were reared for several generations without change of characters appearing in the progeny. This species appears to agree with the description of C. *taxifoliae* (Swain) but examination of the cotypes shows a wide difference in the length of tibial hairs.

Cinara tanneri Knowlton

Cinara tanneri Knowlton, 1930:155 subspecies of *edulis* (Wilson).

Apterous Summer Vivipara. Head, prothorax, lateral mesothorax and band on abdominal VIII blackish; abdomen with a few dark specks at hair bases along sides; cornicle, cauda, anal plate, rostrum, femora, knees, tarsi and tips of tibiae black; antenna and more than half of hind tibia dusky. Body length 4; hind tibia 1.70; hind tarsal II .25; antenna 1.30, III .48, IV .15, V .25, VI .17+.02; cornicle .20 in diameter at base of cone; rostral IV .30, V .09, attaining middle of abdomen. Hairs on vertex and body medium fine to spinelike .04-.06 long; on cornicle .10; on hind tibia at angle of 60 degrees, .06 long (diameter of tibia .08), on III nearly erect, .03-.05 long (diameter of segment .05-.06).

Collection. On *Pinus monophylla.* Utah: Raft River Mountains. Apterous vivipara in June 19; apparently rare.

Type. Knowlton Collection.

Chief Distinguishing Characters. Short IV (but little longer than half of V), rather short hind tibia and long rostral IV (about twice as long as antennal IV).

Not figured on account of similarity to C. *edulis.*

Cinara terminalis (Gillette and Palmer)

The Terminal Twig Pinyon Pine Aphid

Lachnus terminalis Gillette and Palmer, 1924:19.
Cinara terminalis, Gillette and Palmer, 1931:873.

Fundatrix. Same as apterous summer vivipara or color slightly darker.

Apterous Summer Vivipara. Color light cinnamon-brown, in some cases, shading into greenish, darkest on middle of dorsum; light pulverulence on head, thorax and intersegmental lines from abdominal I through IV; appendages yellowish with usual parts black, about half of hind tibia black; cornicle black. Body length 2.25; hind tibia 1.50; hind tarsal II .22-.28; antenna 1; rostrum attaining nearly to end of body. Hairs on hind tibia fine, rather sparse, length about same as diameter of tibia.

Alate Vivipara. Same as aptera except hairs on hind tibia with length 1.5-2 times diameter of tibia; fore wing with media twice-forked.

Ovipara. Same as apterous vivipara except as follows: Size of body variable, usually smaller; entire hind tibia black and with sensoria as figured.

Male. Alate. Similar to alate vivipara except tendency to darker color, appendages entirely black, length of body 1.5-2.0; hind tibia 1.05-1.80; antenna 1-1.4.

Egg. Black; shining. Laid lengthwise on upperside of needles.

Collections. On *Pinus edulis,* on bark of tender twigs, solitary. Colorado: Owl Canyon (in Larimer County) and Walsenburg. Utah: Kanab and Monticello. Fundatrices June 15, apterous summer viviparae June 15 to Oct. 5, alate viviparae June 15 to Oct. 19, oviparae Oct. 13 to 27, males Oct. 13; rather common but difficult to find on account of solitary habits and protective coloration.

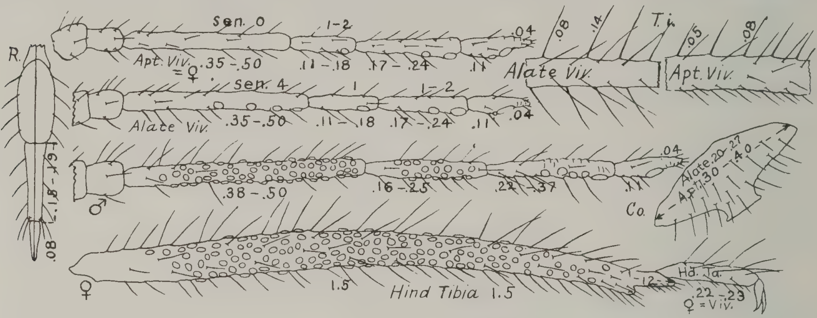

Fig. 46. *Cinara terminalis*

Type. In U.S.N.M., No. 41958. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Light brown body slightly powdery, short antennal segments IV (.11-.18) and V (.17-.24) and rostral IV (.15-.18) and long, fine, semierect hairs on hind tibia.

Cinara thatcheri Knowlton and Smith

Cinara thatcheri Knowlton and Smith, 1938b:66.

(Mounted in balsam), same as *Cinara schwarzii* except as follows: Longer rostral IV (.28-.30, not .20-.23) and antennal V (longer than IV, not approximately equal).

Collections. On *Pinus ponderosa.* Idaho: White Bird Summit, alate and apterous viviparae June 13; rare.

Type. Knowlton Collection.

Cinara vandykei (Wilson)

The Brown Mottled Spruce Aphid

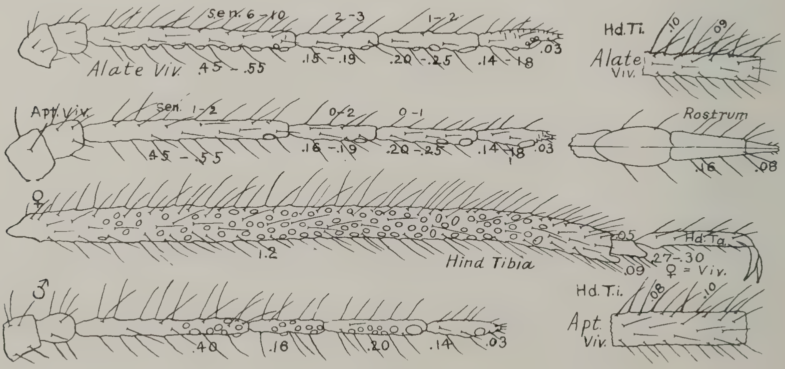

Fig. 47. *Cinara vandykei*

Lachniella vandykei Wilson, 1919b:19.
Lachnus vandykei, Palmer, 1926:317.
Cinara vandykei, Gillette and Palmer, 1931:874.

Fundatrix. Dark rufous brown to metallic black throughout; without pulverulence; legs black except dusky yellowish near bases of femora and tibiae; cornicle black. Measurements as in apterous summer vivipara.

Apterous Summer Vivipara. Color as in fundatrix or lighter and more brownish. Body 2.5-3 by 1.5; hind tibia 1.7-1.8; hind tarsal II .30; antenna 1.25; cornicle .30-.50 in diameter at base; rostrum attaining to about middle of abdomen. Hairs on hind tibia fine, numerous, length slightly longer than diameter of tibia.

Alate Vivipara. Head and thorax black; abdomen dark brown, mottled with yellowish, sometimes yellowish area on median portion of I and II; slight powder on intersegmental lines on VII and lateral areas of all abdominal segments; subcostal area of fore wing dusky. Hairs on hind tibia almost twice as long as diameter of tibia. Fore wing with media twice-branched. Otherwise as in aptera.

Ovipara. Color same as apterous vivipara except heavy pulverulence on abdomen posterior to cornicles; tibia differing as figured.

Male. Apterous. Color dark brown, without pulverulence. Body length 1.90; hind tibia 1.20; antenna 1.1.

Egg. Black; shining; without powder.

Collections. On *Picea engelmanni*, on bark of twigs; eggs singly or in twos, lengthwise end to end on upperside of needles at base. Colorado: Rocky Mountain National Park and Pingree Park. Fundatrices June 11 and July 7, apterous summer viviparae July 16 to 28, alate viviparae July 16 to 28, oviparae July 20 to Aug. 24, males July 20; rather rare.

Type. Granovsky Collection.

Chief Distinguishing Characters. Dark brown to black body with little powder, moderately long tibial hairs (.08-.10), length of rostral IV (.16) and apterous condition of the males and time of their appearance (July).

Cinara villosa (Gillette and Palmer) n. comb.

The Spotted Long-haired Limber Pine Aphid

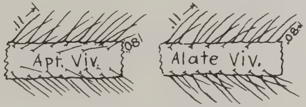

Fig. 48. *Cinara villosa*

Lachnus apini Gillette and Palmer (long haired var.), 1924:33.
Cinara apini var. *villosa* Gillette and Palmer, 1931:847.

Identical with *apini* excepting that the tibial hairs are longer, in the aptera .06, length exceeding half of diameter of tibia, and in the alata .11, 1.5 times diameter of tibia. Hind tarsal II .29-.30. Taken in some localities and on same host as given above for *apini* but not observed mixed in the same colonies or on the same tree.

Collections. On *Pinus flexilis*. Colorado: Rocky Mountain National Park, Chambers Lake (on Poudre River) and Cherokee Park. Fundatrices June 30 to July 8, apterous summer viviparae, July 12 to August 27, alate viviparae July 26 to August 9; common.

Type. U.S.N.M., No. 42811. Paratypes, Colo. Agr. Exp. Sta. Collection. Metatypes, Hille Ris Lambers Collection.

Cinara winonkae Hottes

The American Arbor-vitae Aphid

Cinara winonkae Hottes, 1934:1.
Cinara idahoensis Knowlton, 1935b:238 (in part apterae).

Apterous Summer Vivipara. (Cleared and mounted in balsam), head dark, body pale with two dorsal longitudinal rows of dark dots, one dorsolateral pair on thorax and two rows on each side of abdomen; head, cornicle, tarsi, tips of tibiae, cauda, anal plate and tip of rostrum from distal end of segment II dark to black. Body length 2.6-2.9; antenna .80-.98; hind tibia 1.25-1.35; rostrum attaining about to abdominal IV.

Alate Vivipara. Head and thorax dark; abdomen reddish brown; otherwise same as apterous vivipara except as figured.

Collections. On *Tuja* sp. Utah: Saint George. Idaho: Twin Falls. Wyoming: Torrington. Apterous and alate viviparae Mar. 22 to April 12 and apterae July 13.

Type. U.S.N.M. Paratypes, Colo. Agr. Exp. Sta. and Hottes Collections.

Chief Distinguishing Characters. Small size of the cornicle, long hairs, long base of VI.

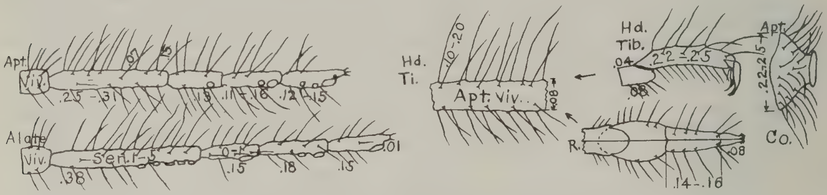

Fig. 49. *Cinara winonkae*

This species resembles *C. tujae* (Del Guercio) (1909a:309 *Lachniella)* but differs as follows: Much longer hairs on hind tibia than figured by Del Guercio (op. cit.) and absence of dark band between the cornicles and broken dashes anterior to the cornicles. However, the specimens studied are cleared and mounted so may have lost some markings visible in life. Comparison of fresh material with specimens of Del Guercio's species may prove Hottes' name to be a synonym.

This species differs from *C. thujaefolia* Theobald (1914c:335) apparently only in the longer hairs, especially on the hind tibia, as observed by study of specimens determined by Mimeur as Theobald's species.

Subtribe **Lachnina***

Pterochlorina Baker, 1920a:17.

Characters. Fore wing with radial sector curved or straight, arising some distance proximad of apex of stigma and with media slender but more distinct than in Cinarina. Hind tarsal I with dorsal side shorter than half of ventral side. Rostral V distinct, obtuse. Ocular tubercle evident. Antenna with unguis usually shorter than half the base of VI. Body brown to black, wings often with smoky bands or spots. Living on woody parts of trees and shrubs.

Key to Genera of Lachnina

1.	Rostrum never much longer than body. Hairs not very fine and short	2
....	Rostrum much longer than body. Hairs very fine and short (p. 56)	*Stomaphis*
2.	Stigma not elongated to apex of wing (p. 52)	*Lachnus*
....	Stigma elongated to apex of wing (p. 55)	*Longistigma*

Genus **Lachnus** Burmeister

Lachnus Burmeister, 1835:91; Schumacher, 1921:185; Hottes, 1930b:185.
Pterochlorus Rondani, 1848:35.

Characters. Rostrum obtuse, V very short but distinct. Hind tarsal I trapezoidal, dorsal side at least third as long as ventral side. Fore wing with radial sector slightly to strongly curved, arising some distance proximad of apex of stigma; media fine but not faint. Wings often smoky. Living on bark of trees and shrubs.

*Sense of Börner not Baker. (Börner, 1930:124.)

Genotype, *Lachnus roboris* Linnaeus (syn. *Lachnus fasciatus* Burmeister) which is the type set by Westwood (1840) or *Lachnus punctatus* Burmeister (1835:93) which is type set by Wilson (1910:151 and 1911b:54).*

Key to Species of Lachnus

1. Dorsal tubercle absent; radial sector of fore wing distinctly curved........ 2

.... Dorsal tubercle present; radial sector of fore wing almost straight (p. 55)........ *saligna*

2. Secondary sensoria present; distinct and tuberculate on III in aptera, large and tuberculate in alata (p. 54)........ *rosae*

.... Secondary sensoria absent or indistinct on III in aptera........ 3

3. Sensoria absent on III of aptera; sternal tubercles absent; tarsal I with a pair of dorsal hairs. (A Rocky Mountain species.) (p. 53)........ *montanus*

.... Sensoria often present on III of aptera; sternal tubercles present; tarsal I without dorsal hairs. (A European species.) (p. 53)........ *roboris*

Lachnus montanus (Wilson)

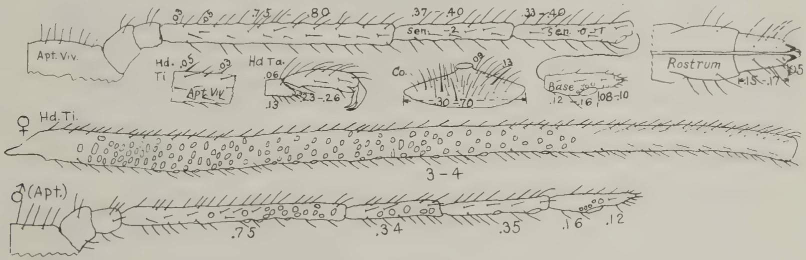

Fig. 50. *Lachnus montanus*

Lachniella montana Wilson, 1919b:42.
Lachnus montanus, Gillette and Palmer, 1931:876.

Apterous Summer Vivipara. Rusty or yellowish brown; legs brown to black. Body 3.5-3.9 by 2; hind tibia 2.1-3.0; antenna 1.7-1.9, unguis heavy, parallel-sided with conical tip. Hairs pointed, spinelike; on hind tibia, sparse, length about half of diameter of tibia; on antenna and body about the same as on tibiae; a pair present on dorsum of hind tarsal I. Rostrum surpassing 3d coxa, very broad and rather obtuse. Sternal tubercles apparently absent.

Ovipara. Apterous. Color same as in apterous vivipara. Body length 4; across eyes .85-.90; antenna 2; hind tibia 3-4. Otherwise as in vivipara.

Male. Apterous. Color as in ovipara. Body length 2.6; across eyes .75; antenna 1.90; hind tibia 2.1; cornicle .25 in diameter at base.

Collections. On *Quercus* sp. Colorado: Cimmarron and Glade Park. Apterous summer vivipara Aug. 22 and Oct. 16; rare.

Cotypes. Granovsky and Colo. Agr. Exp. Sta. Collections.

This species appears very similar to *L. roboris,* judging from the few specimens at hand. The only differences apparent are those given in the key.

[Genotype *Lachnus roboris* (Linnaeus)]

Aphis roboris Linnaeus, 1758:452.
Lachnus fasciatus Burmeister, 1835:93 and 1006; Schumacher, 1921:184 (synonymy declared).
Pterochlorus roboris, Theobald, 1929:112.
Lachnus roboris, Hottes, 1930b:185.

Alate Vivipara. Blackish brown to metallic black; legs tawny brown; wings smoky. Body length 3.2-4; across eyes .75; hind tibia 3.6-4; antenna 1.70-2, secondary sensoria rather flat, and small, in irregular row along entire length of segments, 6 on III (10-12 in examples from Cholodkovsky), 3-4 on IV, 0 on V, unguis conical and heavy. Hairs blunt to pointed, spinelike, on hind tibia almost sparse, at angle of 30 to 40 degrees, hardly half as long as diameter of tibia; absent on dorsum of hind tarsal I; rostrum attaining abdomen; obtuse,

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*The question as to which species is to be considered genotype is now before the International Commission of Nomenclature. However, both species fall in the same generic concept as considered here.

rather stout, terminal segment very short. Fore wing with stigma short and broad, radial sector rather conspicuous; media twice-forked, fine but not faint.

Apterous Summer Vivipara. (Cleared and mounted), head, prothorax, mesothorax, cornicle, cauda, anal plate, spiracles and dorsal glandular specks black; antenna and femora brown; tibiae brown proximally, becoming black distally; tarsi black. Body length 4.2; across eyes .80-.85; hind tibia 3.7-4.0; rostrum attaining abdomen. Hairs pointed to blunt, .05 long on body. Pair of sternal tubercles developed.

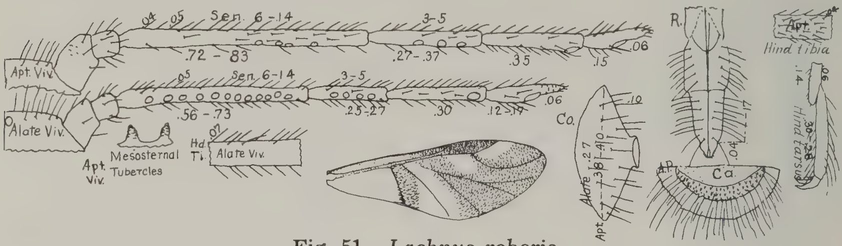

Fig. 51. *Lachnus roboris*

Hosts. On *Quercus* sp. (Not recorded from region.)

Data for description and figures were taken from Theobald (op. cit.) and from specimens determined by Cholodkovsky and Hille Ris Lambers.

Lachnus rosae Cholodkovsky

The Hairy Rose Aphid

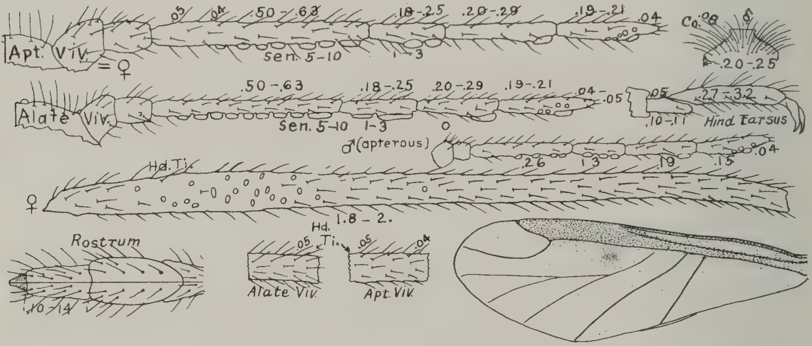

Fig. 52. *Lachnus rosae*

Lachnus rosae Cholodkovsky, 1899:471; Gillette and Palmer, 1931:877.
Pterochlorus rosae, Knowlton, 1929c:33.

Apterous Summer Vivipara. Yellowish or rusty-brown to blackish; legs dusky throughout. Body 2.7-3.5; hind tibia 1.50-2; antenna 1.3-1.6. Hairs fine; on hind tibia length about half of diameter of tibia, same on antenna; on body .07-.08. Rostrum attaining 3d coxa.

Alate Vivipara. Same as aptera except as follows: Wings slightly smoky with darker area between stigma and media.

Ovipara. Apterous. Same in color and measurements as vivipara or darker.

Male. Apterous. Color same as in apterous vivipara. Body length 1.6; hind tibia 1.1; antenna 1.

Collections. On *Rosa fendleri* and other wild species, on bark of stems, near ground; in colonies. Colorado: Foothills near Fort Collins, Bellvue and Log Cabin (northwest of Livermore). Utah: Logan and Plain City. Idaho: Twin Falls. Apterous summer viviparae May 24 to Oct. 25, alate viviparae June 9, sexuales Oct. 15 to 25; usually not common; but extremely abundant in Utah in 1928.

Lachnus salignus (Gmelin)

The Giant Willow Aphid

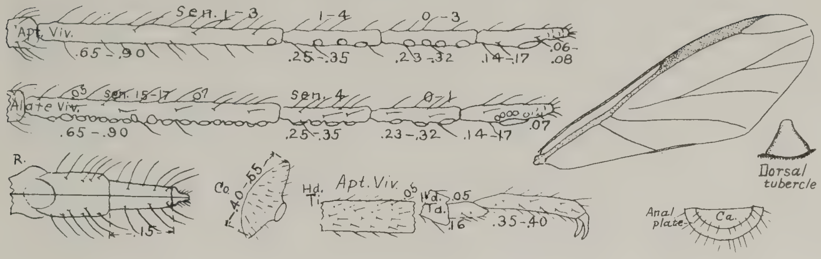

Fig. 53. *Lachnus salignus*

Aphis salicis Sulzer, 1776:105 (preoccupied).
Aphis saligna Gmelin, 1790:2209 (n.n. for *Aphis salicis* Sulzer).
Lachnus punctatus Burmeister, 1835:93.
Aphis viminalis Boyer de Fonscolombe,, 1841:184.
Lachnus dentatus LeBaron, 1872:138.
Lachnus viminalis, Cockerell, 1904:262.
Tuberolachnus viminalis, Knowlton, 1930:159.
Lachnus salignus, Gillette and Palmer, 1931:878.

Apterous Summer Vivipara. Blackish, with numerous hairs, causing a grayish appearance; legs mostly rufous. Body length 4.5-5.5; hind tibia 3-4.5; antenna 1.8-2; rostrum attaining between 2d and 3d coxae. Hairs on hind tibia sparse, length hardly equal to half diameter of tibia.

Alate Vivipara. Same as aptera, except as follows: Secondary sensoria strongly convex, circular to oval, often nearly equal to diameter of antenna, unguis heavy, conical. Hairs on hind tibia .05-.07, length almost or quite equal to diameter of tibia. Dorsal tubercle present on middle of abdomen.

Collections. On *Salix alba, S. regalis, S. elegantissima* and *S.* sp., on bark; in large colonies. Colorado: Fort Collins and Denver. Utah: Throughout northern part of state. New Mexico: Pecos. Apterous viviparae July 10 to Nov. 10, alate viviparae Aug. 9 to Nov. 30; common.

Genus **Longistigma** Wilson

Longistigma Wilson, 1909a:385; Baker, 1920a:17.
Davisia Del Guercio, 1909a:185.

Characters. Fore wing with stigma very long and narrow, ending in an acute point and extending to tip of radial sector; radial sector almost straight, arising some distance proximad of apex of stigma; media fine but not faint, twice-branched; hind wing with two cross-veins. Antenna six-segmented; unguis elongate, fingerlike. Hairs prominent on appendages. Living on woody parts, as trunks and limbs of trees.
Genotype (monotypical), *Aphis caryae* Harris. (Not yet recorded from region.)

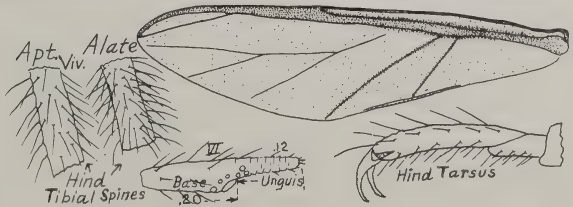

Fig. 54. *Longistigma caryae*

Genus **Stomaphis** Walker

Walker, 1870:2000; Baker, 1920a:18.

Characters. Rostrum much longer than body, V distinct. Tarsi rather stout, I nearly triangular in lateral aspect. Fore wing with radial sector somewhat curved; media twice-branched. Antenna six-segmented. Cornicle on broad hairy cone. Hind wing with media and cubitus widely separated. Ocular tubercle distinct. Male apterous with rudimentary mouth-parts.

Genotype (fixed by Walker 1870:2000), *Aphis quercus* Linnaeus.

Collections. On *Pinus ponderosa* var. *scopulorum,* on roots. Colorado: Poudre Canyon. A single nymph June 16. (Determination of species impossible.)

Subtribe **Tramina** Baker

Baker, 1920a:19.

Characters. Hind tarsal II at least half as long as tibia; segment I minute, almost triangular in lateral aspect. Rostrum obtuse; segment V distinct but minute. Fore wing with radial sector more or less curved. Cornicle inconspicuous, mere rim or pore or apparently absent. Cauda semilunar; anal plate entire. Living on roots of plants and in nests of ants.

Only one genus represented in region.

Genus **Trama** Heyden

Heyden, 1837:293; Baker, 1920a:19.

Characters. As given for tribe. Unguis much shorter than base of VI. Eye small especially in aptera. Hairs fine, pointed, numerous.

Genotype (monotypical), *Trama troglodytes* Heyden.

Key to Species of Trama

1. Hind tarsus half to four-fifths of length of tibia; eye in aptera of few facets only; cornicle evident in alata (p. 57)........*troglodytes*

.... Hind tarsus nine-tenths of length of tibia; eye in aptera of 15 facets or more; cornicle not evident in alata (p. 56)........*rara*

Trama rara Mordvilko

The Long-footed Dandelion Aphid

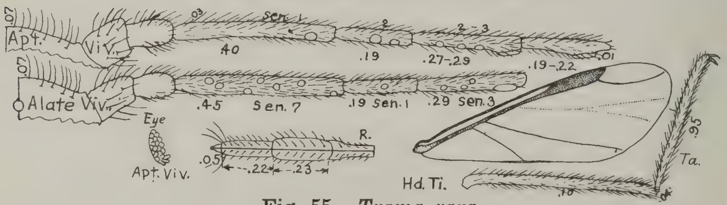

Fig. 55. *Trama rara*

Trama rara Mordvilko, 1908:373 and 1935:275 and 277 (synonymy with *oculata* Gillette and Palmer declared).

Trama oculata Gillette and Palmer, 1930:547 and 1931:881.

Apterous Vivipara. Pale whitish in younger, to olive-brown in older examples; legs yellowish with entire tarsi of 1st and 2d pairs dusky, of 3d pair dusky distally only; antenna brownish yellow, dusky distally; rostrum dusky. Body length 3; hind tibia 1; antenna 1.50, primary sensorium long and flat, secondary sensoria flat, indistinct, irregularly shaped and scattered; cornicle not evident; rostrum attaining middle of abdomen. Hairs pointed, fine, numerous, drooping, about .03 long on antenna and hind tibia, length equalling about half of diameter of segment bearing them.

Alate Vivipara. Same in color and measurements as aptera or slightly smaller.

Collections. On *Taraxacum officinale,* on roots and under stone in ants' nests. Colorado: Foothills near Masonville, Longmont and Fort Collins. Apterous viviparae outdoors Feb. 23 to Nov. 6 and in greenhouse Jan. 18, alate viviparae Nov. 6 and in greenhouse Jan. 18.

Type. U.S.N.M., No. 43001. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Long hind tarsal II (.95, nine-tenths of the length of tibia), apparent absence of cornicle, and eye of aptera (showing more than 15 facets).

[Genotype *Trama troglodytes* Heyden]

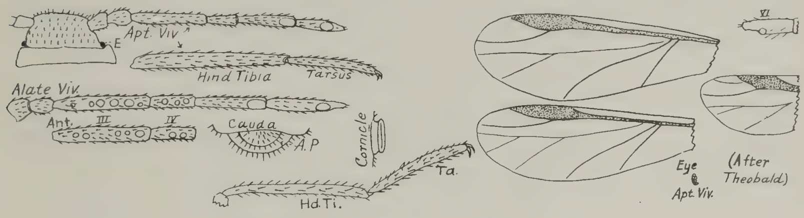

Fig. 56. *Trama troglodytes*

Trama troglodytes Heyden, 1837:293; Buckton, 1881:68; Theobald, 1929:94.

Apterous Summer Vivipara. Pale yellowish white to pearly white or dull brownish green. Body length 2.5-3.5; hind tibia .90; hind tarsal I minute, triangular, II .72; antenna about half the length of body, III nearly or quite equal to IV+V, IV less than half of III, much shorter than V, V longer than VI, unguis very short and blunt, secondary sensoria absent; cornicle apparently absent; eye very small and dark, of a few facets only; rostral IV .20-.25, V .06, attaining middle of body or more. Hairs numerous on body and appendages.

Alate Vivipara. About the same in color and measurements as aptera except as follows: Secondary sensoria of various sizes; cornicle present as slightly raised rim.

Hosts. On the roots of compositae and in nests of ants. (Not taken in region.)

Data for above description and drawings taken from Theobald (op. cit.) and from examples determined by Cholodkovsky.

Tribe **Thelaxini** Baker

Baker, 1920a:17.

Characters. Frontal tubercles undeveloped. Antenna five-segmented, with unguis shorter than base of VI. Cornicle mere ring on more or less elevated base. Cauda semicircular or knobbed; anal plate rounded. Hairs simple.

Key to Genera of Thelaxini

1. Cauda distinctly knobbed (p. 57) .... *Thelaxes*
.... Cauda not knobbed, semicircular (Not taken in region) .... *Glyphina*

Genus **Thelaxes** Westwood

Westwood 1840:118; Baker 1920a:21.

Characters. Frontal tubercles undeveloped; antenna five-segmented with unguis shorter than half of base of segment VI; cornicle mere rim on slightly mammiform base. Cauda knobbed; anal plate rounded. Rostrum with segment V needlelike, apparently distinct. Hairs simple; some fine, others heavy, spikelike.

Genotype (fixed by Westwood 1840) *Thelaxes quercicola* Westwood (syn. of *Aphis dryophila* Schrank).

Thelaxes californica (Davidson)

The Oak Bud Aphid

Chaitophorus sp. Davidson, 1914a:128.
Vacuna dryophila Schrank ? (misidentification), Davidson, 1917b:290.
Vacuna californica Davidson, 1919b:245.
Thelaxes californica, Essig, 1926 (1947 ed.):230.

Apterous Summer Vivipara. (Mounted in balsam), colorless except often with brownish dorsal patch, broken on median line, on abdominal I to V, the brown color in minute spots giving reticulated appearance; appendages pale brownish, darker distally. Body length 1.80-1.90; across eyes .40; antenna .60-.65; hind tibia .50-.55; rostrum with needlelike tip, attaining 3d coxa. Hairs on body of two kinds, on dorsum heavy, sharp, spikelike, .03; on venter slender, fine and .05 long; on antennal III fine and sparse; on hind tibia fine, slightly longer than diameter of tibia. Cornicle a mere rim on slightly raised base which latter bears about 4 fine hairs. Cauda knobbed; anal plate entire but with appearance of median depression. Lateral tubercles small, evident on prothorax.

Alate Vivipara. (Mounted on slide), head and thorax blackish; antenna, rostrum, cornicle, lateral areas on abdomen and legs more or less dusky; cauda and anal plate pale to slightly dusky. Body length 1.2; across eyes .30-.32; antenna .55-.60; hind tibia .50; hind tarsal II .09; rostrum with tip beyond hairs parallel-sided, resembling distinct segment V, attaining 2d coxa. Cornicle shallow-conical, bearing a few simple hairs. Cauda knobbed, bearing 2 pairs of lateral and 2 pairs of dorsolateral hairs and a single preapical one. Fore wing with media once-branched; hind wing with a single cross-vein.

Ovipara. Apterous. (Mounted on slide), immaculate; appendages pale, to slightly dusky, especially distally. Body length .70; across eyes .22; antenna .30; hind tibia slightly swollen and bearing a few faint, scattered sensoria especially on proximal half. Rostrum with needle-like tip beyond hairs inconspicuous. Cornicle and cauda as in viviparae. Hairs heavy and spikelike on body with occasionally one pair of fine ones on vertex.

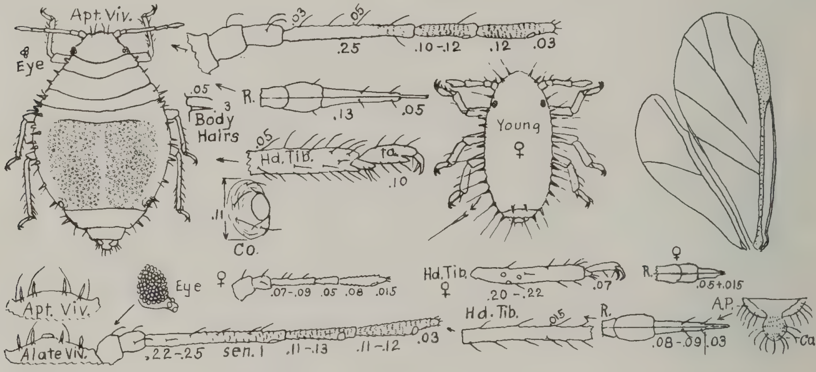

Fig. 57. *Thelaxes californica*

Collections. On *Quercus* sp. Colorado: near Gateway. Utah: Thistle and Castle Gate. Apterous viviparae June 9 and 29, alate viviparae June 27 and 29, oviparae Sept. 29 to Oct. 11; somewhat common in Utah.

Distinct status of this form from *T. dryophila* is doubtful, considering the variations in apterous viviparae of the latter obtained from various workers. The only difference discovered is the smaller number of sensoria on antenna of alate vivipara.

[Genotype *Thelaxes dryophila* (Schrank)]

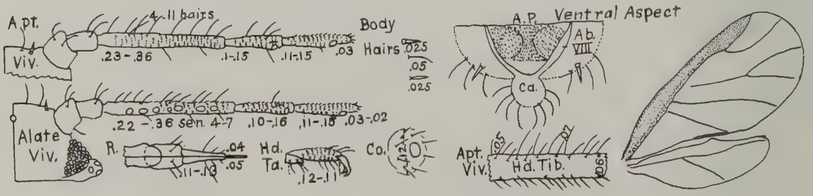

Fig. 58. *Thelaxes dryophila*

Aphis dryophila Schrank, 1801:113.
Thelaxes quercicola Westwood, 1840:118.
Thelaxes dryophila, Buckton, 1883:8.
Vacuna dryophila, Tullgren, 1909:36; van der Goot, 1915:422; Theobald, 1929:73.

Apterous Vivipara. (Cleared and mounted), brown throughout dorsum, showing reticulated pattern on abdomen, lighter medially in some specimens, in others dorsum pale; all appendages including cornicle, cauda and anal plate brownish. Body length 1.15-2.2; across eyes .31-.43; hind tibia .40-.75; antenna .55-.95; imbrications denticulate; rostrum hardly attaining 3d coxa. Cornicle mere rim on slight mammiform base which bears about 6 simple hairs. Cauda knobbed; anal plate entire but apparently with groove on median line. Hairs on body of two kinds namely heavy spikelike hairs, .025 long, rather sparse, located on dorsum and fine hairs .05 long located on venter; on antenna and tibiae fine. Lateral tubercles present but minute on all segments.

A single apterous vivipara taken in July and determined by Mimeur measured as follows: Body length 1.1; across eyes .30; hind tibia .35; hind tarsal II .08; antenna .52, III+IV (coalesced) .16, V .08, VI .10+.02; rostral IV .12, V .05.

Alate Vivipara. (Cleared and mounted on slide), head and thorax black; abdomen with dark dorsal bands (broken anterior to cornicles) and lateral areas blackish; all appendages dark. Body length about 2; across eyes .38; antenna about .80; hind tibia .70. Hairs of two kinds, namely, heavy spikelike hairs seen on vertex but hardly evident on body and fine, slender hairs on venter of body and on appendages. Otherwise as in apterous vivipara. Fore wing with media once-forked; hind wing with cubitus lacking.

Host. *Quercus* sp. on leaves and twigs. (Not taken in region.)

Data for above description and drawings were obtained by study of specimens taken in June and July and determined by Tullgren, van der Goot, Hille Ris Lambers and T. Pergande.

Tribe **Panaphini** n.n.*

Callipterini Oestlund, 1887:34.

Characters. Antenna usually long and slonder, usually with few sensoria in viviparae. Tarsal I approximately triangular in lateral aspect.

Cauda knobbed or semilunar; anal plate usually bilobed. Fore wing with radial sector curved, often faint or absent; media twice-forked, never faint. Cornicle usually inconspicuous, truncate or cup-shaped, rarely elongate or mere pore or absent. Rostrum obtuse, with V indistinct (coalesced with IV). Living on foliage of plants.

Key to Subtribes of Panaphini

1. Ocular tubercle absent; rostral IV about as broad as long. (p. 79) .... *Saltusaphina*
.... Ocular tubercle present (inconspicuous in *Stegophylla* in Phyllaphina); rostral IV longer than broad 2
2. Cornicle absent. (p. 111) .... *Fullawayina*
.... Cornicle present 3
3. Cornicle a mere ring 4
.... Cornicle truncate or elongate 5
4. Cornicle a mere ring on a low conical base (p. 59) .... *Phyllaphina*
.... Cornicle a mere ring not on a low conical base (p. 69) .... *(Monellia) Panaphina*
5. Body and vertex and usually antenna with conspicuous spinelike hairs; anal plate not deeply divided; frontal tubercles not developed; radial sector distinct 7
.... Body, vertex and antenna not with conspicuous spinelike hairs or if with conspicuous hairs, then anal plate deeply divided *(Panaphis)* or frontal tubercles developed or radial sector faint 6
6. Fore wing with radial sector indistinct or lacking (except in *Euceraphis*, *Oestlundiella* and *Neosymydobius*); cornicle not much longer than width at base. (p. 62) .... *Panaphina*
.... Fore wing with radial sector distinct; cornicle much longer than width at base. (p. 85) .... *Drepanosiphina*
7. Cornicle truncate, reticulated. (p. 90) .... *Chaitophorina*
.... Cornicle elongate, not truncate and not reticulated. (p. 104) .... *Pterocommina*

Subtribe **Phyllaphina** n.n.

Phyllaphidina Baker, 1920a:25.

Characters. Frontal tubercles not developed. Wax glands present. Cornicle mere ring on low conical base. Antenna six-segmented, with secondary sensoria

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**Callipterus* Koch (1857) is preoccupied by *Callipterus* Agassiz (1846) and has been replaced by *Panaphis* Kirkaldy (1904). This necessitated a corresponding change in the tribal name. See synonymy under *Panaphis*.

transverse, unguis of VI much shorter than base. Eye not protruding. Cauda semilunar or knobbed. Tarsal I triangular in lateral aspect. Fore wing with radial sector curved, media twice-branched and not faint. Ovipara often alate; producing several eggs. Living exposed or in folded leaves, usually protected by flocculent secretion.

Key to Genera of Phyllaphina

1. Secondary sensoria transverse; antenna with transverse rows of denticles; fore wing with media arising proximad of stigma; ocular tubercle evident. (p. 61) ....*Tamalia*

.... Secondary sensoria not transverse; absent on apterous vivipara; antenna not with denticles; fore wing with media arising from stigma; ocular tubercle not evident. (p. 60) ....*Stegophylla*

Genus **Stegophylla** Oestlund

Oestlund, 1922:146; Gillette and Palmer, 1931:885.

Characters. Frontal tubercles lacking. Antenna six-segmented; not noticeably setose, nor with evident hairs; II distinctly longer than I and approximately coequal with IV in apterous forms; unguis much shorter than base of VI; secondary sensoria circular. Ocular tubercle not evident. Cornicle a mere ring on a low conical base. Fore wing with media simple or twice-branched* and arising from the stigma. Cauda broader than long and rounded; anal plate entire in all forms. Male usually alate but sometimes apterous and with antenna bearing sensoria; all other forms apterous. Ovipara apterous and laying many eggs. Summer forms covered with flocculent material. Living exposed on leaves and twigs or in folded leaves of *Quercus* sp.

Genotype (monotypical), *Phyllaphis quercicola* Baker.

Key to Species of *Stegophylla*

1. Hind wing with two cross-veins; rostral IV+V .08-.10 long. (p. 60) ....*quercicola*

.... Hind wing with one cross-vein; rostral IV+V .13 long. (p. 61) ....*quercifoliae*

[Genotype *Stegophylla quercicola* (Monell)]

Callipterus? quercicola Monell, 1879:31 (desc. of male).
Phyllaphis querci (Fitch) (misidentification), Davis, 1911c:242.
Phyllaphis quercicola Baker, 1916e:362.
Stegophylla quercicola, Gillette and Palmer, 1931:885; Hottes, 1934:8 (synonymy).

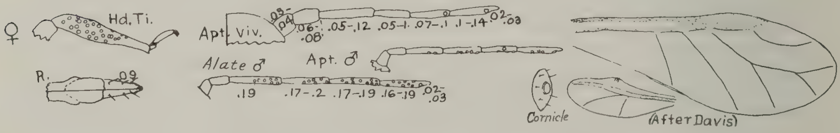

Fig. 59. *Stegophylla quercicola*

Apterous Vivipara. Pale greenish or yellow to brownish with heavy flocculence; legs pale greenish; abdomen with six longitudinal rows of wax glands. Body length 1.0; across eyes .22; antenna .40-.60, usually six-segmented but often five-segmented; hind tibia .40; hind tarsal II. 09; rostral IV+V .08-.09, attaining hardly to 2d coxa. Hairs inconspicuous. Cornicle merely a dusky ring. Cauda subobsolete, rounded; anal plate rounded.

Ovipara. Apterous. About the same as apterous vivipara except with hind tibia bearing circular sensoria on considerably swollen proximal two-thirds.

Male. Alate or apterous. Fore wing with media simple or once-branched. Body length 2.6; hind tibia .50-.56; hind tarsal II .11; antenna .83-.90, secondary sensoria minute; rostral IV+V, .07-.10 hardly attaining 2d coxa.

Host. *Quercus agrifolia* and *Q. wislizenii,* exposed on leaves and twigs or in galls on edges of leaves. (Not recorded in region.)

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*Oestlund, in his original description of the genus, says "Mediae of fore wings with only one branch" but Davis, (1911c:242) states and figures venation of media as varying from two-branched to simple. Baker (1916e:362) applied the name *quercicola* n.n. to the insect described by Davis in above-mentioned reference. Davis' description is accordingly used as basis for the generic description here given.

Data for above description and drawings obtained from description by Davis (op. cit.) and from specimens loaned by Hottes.

Type. Davis Collection.

Stegophylla quercifoliae (Gillette)

The Woolly Oak Aphid

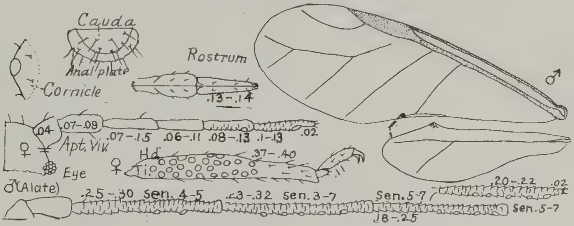

Fig. 60. *Stegophylla quercifoliae*

Schizoneura querci (Fitch) (misidentification), Cowen (in Gillette and Baker), 1895: 116.
Phyllaphis quercifoliae Gillette, 1914a:272.
Stegophylla quercifoliae, Gillette and Palmer, 1931:886.

Apterous Summer Vivipara. Head and thorax yellowish to yellowish brown; abdomen yellow or yellowish green covered with flocculence; eyes bright red; appendages yellow to brown, dusky distally. Body length 1.1-1.5; hind tibia .30-.40; hind tarsal II .10; antenna .50. Cornicle a mere pore on a darkened area, hardly raised. Hairs very sparse .01-.02 long. Antenna imbricated, unguis fingerlike; rostrum slender but without needlelike point, barely attaining 2d-3d coxa.

Ovipara. Apterous. Head dusky; rest of body pale yellowish green to straw-yellow, some individuals pink; flocculent; wax glands in 6 longitudinal rows, showing as minute dark dots on dorsum, 2 large circular wax plates on venter of abdominal V and VI and partially covering VII producing tufts of short wax threads which project beyond the margin of the abdomen; appendages; especially hind tibia, cauda, anal plate and tip of rostrum dusky. Length of body 1.3-1.6; antenna .55-.65; rostrum surpassing 2d coxa, hind tibia swollen for nearly entire length and bearing numerous sensoria. Cornicle merely a raised pore on cone-shaped base.

Male. Alate. Head and thorax blackish; abdomen pink to brownish yellow; powdery, with a few long cottony threads more or less covering appendages; appendages, cauda and anal plate blackish. Fore wing with media twice-branched; hind wing with but one cross-vein. Wing veins heavy and narrowly bordered. Length of body .95-1.05; antenna 1.10; hind tibia .60-.65.

Egg. At first, pale green; later, black; covered with short fragments of waxy secretion taken from the dense patches produced by the ventral wax glands and placed here by the hind tarsi of the female just after she has laid the egg. Size .50 by .30.

Collections. Quercus undulata and other scrub oaks, exposed on leaves or in folded leaves. Colorado: Southern part on both eastern and western slopes of the Rocky Mountains. Utah: Throughout the state. Apterous viviparae June 30 to Oct. 7, sexuales Oct. 18; rather common.

Type. U.S.N.M., No. 42813.

Chief Distinguishing Characters. Single cross-vein in hind wing, length of rostral IV + V (.13 - .14) and comparatively slender shape of the latter but without needlelike tip in ventral aspect.

Genus **Tamalia** Baker

Baker, 1920a:24; Gillette and Palmer, 1931:883.

Characters. Frontal tubercles absent; antenna six-segmented, minutely denticulate and with narrow transverse sensoria. Tarsal I triangular (in lateral aspect). Cauda rounded, broader than long; anal plate entire. Eye in aptera of 3 facets only; ocular tubercle present in alatae. Hairs simple. Fore wing with media twice-branched* and arising proximad of stigma. Sexuales both alate; ovipara laying many eggs. Living concealed in galls on leaves.

Genotype (monotypical), *Pemphigus coweni* Cockerell.

Genotype *Tamalia coweni* (Cockerell)

The Manzanita Leaf-gall Aphid

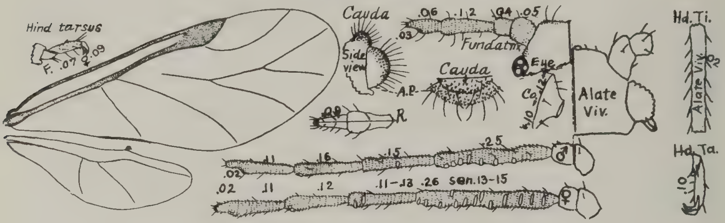

Fig. 61. *Tamalia coweni*

"Aphid" Cowen (in Gillette and Baker), 1895:125.
Pemphigus coweni Cockerell, 1905:391.
Phyllaphis coweni, Gillette, 1909d:41; Essig, 1915:187.
Cryptosiphum tahoense Davidson, 1911a:559 and 1912:404 (synonymy declared).
Tamalia coweni, Baker, 1920a:24; Gillette and Palmer, 1931:884.

Fundatrix. Apterous. Dull sordid yellow to blackish, in older individuals with broken transverse bands of very dark olive-green over most or all of dorsum; head, appendages and genital plate dark. Antenna and dorsum of body denticulate. Body 1.25-1.5 by 1; shape stout pyriform; hind tibia .22-.26; hind tarsal II .07 long; antenna .30; cornicle about .09 in diameter at base of flat cone. Hairs on body simple, short and sparse.

Alate Vivipara. Same as ovipara except longer legs, hind tibia about .60-.68 and lacking waxy secretion on posterior segments of abdomen.

Ovipara. Alate. Color about as in fundatrix; sides of abdominal IV to VIII with heavy tuft of cottony secretion. Body length 1.50-1.70; antenna .65-.85; rostrum barely attaining 2d coxa.

Male. Alate. Light yellow, head black on front and lateral margins, scutellum and mesothoracic lobes dark; appendages more or less dusky. Body length .80-1.; antenna .80.

Gall. Pod-shaped gall formed by one-third of leaf folding lengthwise on remaining two-thirds, enclosing the lice and swelling so as to resemble a minute pea pod, either green or red, 10-20 long.

Collections. On *Arctostaphylos uva-ursi,* on leaves. Colorado: Foothills above Bellvue, Fort Collins, Big Thompson Canyon, Ward and Estes Park. Utah: Bryce Canyon. Fundatrices July 15 to Aug. 8, alate viviparae Aug. 5 to Oct., sexuales Aug. 5 and 22; rather rare.

Type. U.S.N.M.

Subtribe **Panaphina** n.n.

Callipterina Baker, 1920a:25.

Characters: Antenna generally bearing only minute hairs or bristles (except *Panaphis*). Cornicle truncate, never much longer than broad at base; not reticulated; sometimes a mere rim or pore *(Monellia)*. Cauda usually knobbed, or rounded, rarely elongate; anal plate usually indented or bilobed in viviparae. Rostrum obtuse, V indistinct (fused with IV). Aptera usually with capitate hairs. Viviparae, including fundatrix, usually alate. Fore wing with media twice-branched, radial sector usually faint (except *Euceraphis*). Living on leaves or bark, usually solitary; active when disturbed.

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*Baker's statement (op. cit.) that the media of fore wing is once-branched is evidently an error or based on an exceptional specimen. No such statement occurs in the descriptions by Cockerell (1905:391), Cowen (1895:125) or Gillette (1909d:41) for the Colorado examples nor by Davidson (1911a:559) or Essig (1915:187) in their descriptions of the California specimens. The numerous alate examples in the collection of the Colo. Agr. Exp. Sta. all show media of fore wing twice-branched.

Key to Genera of Panaphina

1.	Hairs prominent (fine, .05-.10 long) on antenna and cornicle. (p. 79)	*Panaphis*
....	Hairs not prominent on antenna and cornicle	2
2.	Frontal tubercles not exceeding vertex	3
....	Frontal tubercles exceeding vertex	6
3.	Anal plate distinctly divided or bilobed	4
....	Anal plate only slightly indented or entire	5
4.	Cornicle fairly well developed, truncate (p. 70)	*Myzocallis*
....	Cornicle a mere pore (p. 69)	*Monellia*
5.	Imbrications on antenna or cornicle denticulate; unguis at least half as long as base of VI (p. 76)	*Neosymydobius*
....	Imbrications not denticulate; unguis less than half as long as base of VI (p. 67)	*Chromaphis*
6.	Hairs capitate in alata (p. 66)	*Cepegillettea*
....	Hairs not capitate in alata	7
7.	Secondary sensoria circular or oval; hairs capitate or pointed	8
....	Secondary sensoria transverse, more or less narrow; hairs minute and not capitate even in aptera (p. 68)	*Euceraphis*
8.	Cornicle not on mammiform base; hairs capitate in nymph and aptera (p. 63)	*Calaphis*
....	Cornicle on mammiform base; hairs short, not capitate in aptera (p. 78)	*Oestlundiella*

Genus **Calaphis** Walsh

Walsh 1862:301; Baker, 1920a:26.

Characters. Frontal tubercles well developed; vertex not produced. Hairs on vertex and body capitate and long in aptera and nymph, short and blunt in alata. Antenna longer than body, with minute spinelike hairs, unguis much longer than base of VI; secondary sensoria subcircular to circular, present in both apterous vivipara and ovipara; permanent sensorium at base of unguis long-oval and with cilia. Fore wing with veins somewhat smoky; radial sector faint or absent. Cornicle short, truncate. Cauda knobbed; anal plate bilobed in viviparae. Both cauda and anal plate with numerous stout hairs. Living on leaves of trees, more or less solitary.

Genotype (monotypical), *Calaphis betulella* Walsh.

Key to Species of Calaphis

1.	Without dusky markings in viviparae	3
....	With distinct dusky markings	2
2.	With conspicuous vittae in alata, dusky speckles in aptera; hairs capitate and long in aptera, pointed and minute in alata (p. 63)	*betulella*
....	Without vittae but with dusky bands on all segments in both alata and aptera; hairs pointed and long in aptera and alata (p. 76)	*(Neosymydobius annulatus)*
3.	Sensoria on III of alata at least 8	4
....	Sensoria on III of alata not more than 8 (p. 64)	*coloradensis*
4.	III shorter than .80; first sensorium on III of aptera only .04 mm from base of III (p. 66)	*viridipallida*
....	III not shorter than .80; first sensorium on III of aptera about .10 mm from base of segment (p. 65)	*granovskyi*

[Genotype *Calaphis betulella* Walsh]

Calaphis betulella Walsh, 1862:301; Baker, 1916b:185

Alate Vivipara. Yellowish, with three black vittae over head and thorax, and black bands bordering anterior and posterior margins of abdominal II to VI; femora pale with black vittae and fasciae; tibiae and tarsi black; fore wing with stigma and veins narrowly margined with black and smoky at tips; radial sector obsolete, media twice-forked. Body length 2-2.5; hind tibia 2-2.25; hind tarsal II .15; antenna 3.6-4. Cornicle faintly imbricated. Hairs pointed .03-.05 long on body and legs.

Host. Leaves of *Betula* sp. (Not yet recorded from region.)

Type. Lost. Neotype, selected by Hottes, Ill. Nat. Hist. Surv. Collection, No. 4657.

Determination of specimens used in this description was aided by opinions of Monell and Pergande.

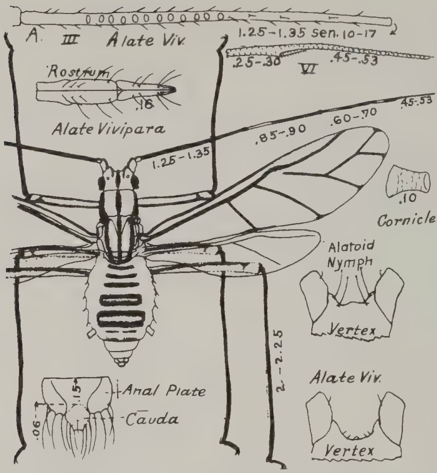

Fig. 62. *Calaphis betullela*

Calaphis coloradensis Granovsky

Calaphis coloradensis Granovsky, 1939:145.

Apterous Summer Vivipara. "Pale yellowish to greenish rarely with brownish shading"; with appendages pale except antenna annulated and tarsi, knees and tips of tibiae black. Body length 1.50-1.60; across eyes .42-.45; antenna about 3; hind tibia 1-1.40; hind tarsi .15; rostral IV—V .13-.15, attaining about to 2d coxa. Cauda knobbed; anal plate indented. Cornicle truncate, narrower in middle. Hairs capitate, long and conspicuous on vertex and body; inconspicuous and sparse on antenna; pointed and short on tibiae.

Alate Vivipara. Head and thorax "orange-yellow; abdomen pale yellow with greenish patches"; appendages pale except antenna annulated and tarsi, knees and tips of tibiae black. Fore wing hyaline with costa and subcosta pale, stigma somewhat darkened along posterior side and especially on distal end; anal and cubital veins heavy and narrowly bordered. Body length "1.54"-1.7; antenna 2.50; hind tibia 1.15; rostrum attaining between 1st and 2d coxae. Hairs slightly capitate, short and sparse on vertex and body; pointed and short on tibiae.

Ovipara. Apterous. "Pale greenish yellow to orange, usually with black transverse bands"; appendages as in viviparae. Body length 2.30 including ovipositor which is slightly drawn out; antenna about 2.70, hind tibia with proximal two-thirds slightly swollen and bearing numerous sensoria. Otherwise as in summer apterous vivipara except anal plate which is entire.

Male. Apterous. Color same as in ovipara except that dorsal bands may be coalesced. Body length "1.47"; antenna 2.60-2.90; hind tibia 1.12.

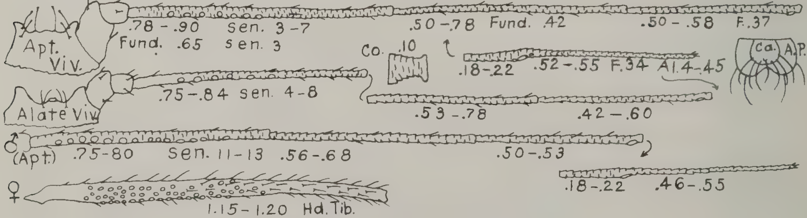

Fig. 63. *Calaphis coloradensis*

Collections. On *Betula fontinalis* and *B. alba,* on leaves and terminal shoots. Colorado: Denver, Fort Collins and Manitou. Utah: Various localities especially in north central part of state. Apterous viviparae Apr. 29 to Oct. 4, alate viviparae Apr. 29 to June 21, sexuales Sept. 28 to Oct. 20; rare.

Holotype. Granovsky Collection. Allotype and gynetype, Univ. of Minn. Paratypes, U.S.N.M., Univ. of Minn., Colo Agr. Exp. Sta., Utah Agr. Exp. Sta., Ill. Nat. Hist. Surv. and Granovsky Collections.

Chief Distinguishing Characters. Pale immaculate body and appendages, number of sensoria on III of alate and apterous viviparae (4-8), presence of apterous viviparae, apterous condition of the male and heavily darkened anal and cubital veins and bordered and tipped media.

Calaphis granovskyi n. sp.

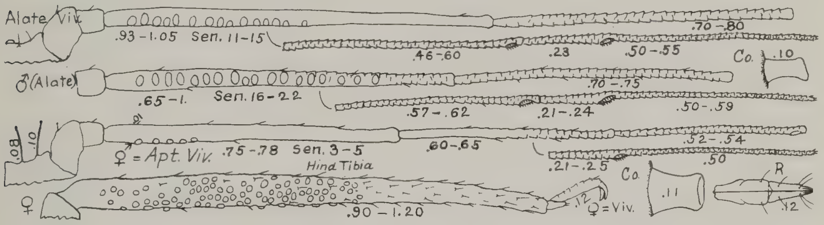

Fig. 64. *Calaphis granovskyi*

Calaphis betulaecolens (Fitch), (misidentification), Gillette and Palmer, 1931:901.

Alate Vivipara. Head and thorax pale lemon-yellow to brownish yellow; abdomen pale yellowish tinged with green; without black markings; antenna annulated; legs pale to slightly dusky with knees, tarsi and tips of tibiae and of rostrum blackish; fore wing hyaline, without smoky tips on veins and with anal and cubital veins not distinctly heavy or bordered. Body length 1.6-1.7; across eyes .42; antenna 2.8-3.3; hind tibia 1.30-1.50; hind tarsal II .11-.12; rostrum attaining between 1st and 2d coxae. Cauda knobbed; anal plate indented. Hairs inconspicuous.

Apterous Summer Vivipara. Pale; appendages as in alate vivipara. Body length 2; across eyes .50; antenna 2.7-2.9; hind tibia 1.40; hind tarsal II .14; rostrum attaining 2d coxa. Hairs capitate, .10 long on vertex; pointed, .01 and sparse on antennal III; .03-.05 on hind tibia; .09 on side of abdomen.

Ovipara. Apterous. Pale yellow, shading to green or red laterally and posteriorly and with short, often broken, black dorsal bands on abdominal I to V; appendages and measurements as in apterous summer vivipara except tibia with proximal half to two-thirds moderately swollen and thickly covered with small sensoria.

Male. Alate. Pale green with dorsum of head, thorax and dorsal bands on all abdominal segments black; appendages slightly dusky, darker on knees and tarsi and at tips of segments of antenna. Measurements as in alate vivipara.

Egg. Newly laid, pale lemon-yellow; later, black. Size .56 by .26.

Collections. On leaves of *Betula alba, fontinalis* and sp. Colorado: Fort Collins and Denver. Utah: Throughout northern part of state. Alate and apterous viviparae June 21 and Sept. 12, sexuales Oct. 10 and 16. Rare.

Type. U.S.N.M., No. 59325. Paratypes, Colo. Agr. Exp. Sta. and Granovsky Collections.

Chief Distinguishing Characters. Pale color of body with absence of vittae or dorsal bands in alate vivipara and absence of smoky tips on veins of fore wing or conspicuously heavy anal and cubital veins, number of sensoria on III of alate vivipara (8-11), length of antenna (III .84-1.05, IV .65-.80 and VI .22+ .50 - .55), length of rostral IV + V (.12), presence of apterous vivipara and alate condition of the male.

Acknowledgements are due to Granovsky who called attention to this form.

This species differs from *C. betulaecolens* (Fitch) in the shorter antenna and fewer sensoria. Type specimens of Fitch's species show antennal measurements as follows: III 1.20 - 1.27 with 12 - 15 sensoria, IV .77 - .95, V .68 - .75, VI .29 - .30 + .70.

Calaphis viridipallida n. sp.

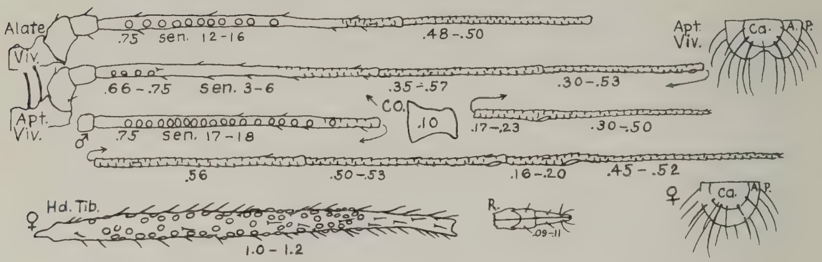

Fig. 65. *Calaphis viridipallida*

Alate Vivipara. Head and thorax brownish; abdomen pale yellowish green; appendages pale with knees, tips of rostrum and of tibiae dark, antenna annulated. Wings hyaline, veins not conspicuously bordered or unusually heavy, radial sector subobsolete on proximal half. Body length 1.30-1.60; across eyes .39-.40; across head before eyes .27; hind tibia 1.03. Cornicle narrower in middle, broader at base and with pronounced flange. Cauda knobbed; anal plate indented.

Apterous Summer Vivipara. Pale yellowish green; appendages pale with tarsi, tips of tibiae and of rostrum dark; antenna annulated. Body length 1.6-2.2; across eyes .42-.45; antenna 2.3-2.7; hind tibia 1-1.2; rostrum attaining or surpassing 2d coxa.

Ovipara. Apterous. Same as apterous vivipara except hind tibia, proximal three-fourths or more of which is moderately swollen and covered with numerous small sensoria and anal plate which is entire.

Male. Alate. Head and thorax brown; abdomen pale yellowish or greenish with short dorsal bands which are often coalesced into a black dorsal patch; appendages pale to brownish with knees, tarsi, claspers, tips of rostrum and of tibiae dark; antenna annulated; wings hyaline. Body length 1.6-1.7; antenna 2.5-2.7; hind tibia 1.15-1.25; rostrum attaining between 1st and 2d coxae.

Collections. On leaves of *Betula* sp. Colorado: Fort Collins, and Colorado Springs. Alate viviparae June 19, apterous viviparae June 19 and Sept. 9, sexuales Sept. 9 (in Minnesota), oviparae Oct. 11 to 23; rare.

Type. U.S.N.M., No. 59324. Paratypes, Colo. Agr. Exp. Sta. and Granovsky Collections.

Chief Distinguishing Characters. Location of sensoria on III of aptera which is unusually close (.04) to base of segment, shortness of antenna (2.3-2.7) especially IV and V (not exceeding 2.5 x base of VI), short rostral IV+V, (.09-.11), absence of noticeably heavy anal and cubital veins or smoky tips of veins of fore wing and pale body color without vittae in alate vivipara.

Acknowledgements are due to Granovsky for calling attention to the undescribed state of this form and contributing specimens from Minnesota.

Genus **Cepegillettea** Granovsky

Granovsky, 1928b:114.

Characters. Frontal tubercles prominent; antennal I Macrosiphumlike. Vertex and antenna with short capitate hairs; alike in alata and aptera. Antenna longer than body; unguis longer than base of VI; III with secondary sensoria in all life cycle forms; permanent sensorium at base of unguis long-oval. Cornicle short, truncate, imbricated. Cauda spatulate, long, with evident neck and long basal portion; tip Calaphislike; anal plate moderately cleft. Fore wing with veins heavy and somewhat bordered, at least, smoky at tip; radial sector present or absent. Living on leaves of trees.

Genotype (set by Granovsky, 1928b:114), *Cepegillettea betulaefoliae* Granovsky.

Genotype *Cepegillettea betulifoliae* Granovsky

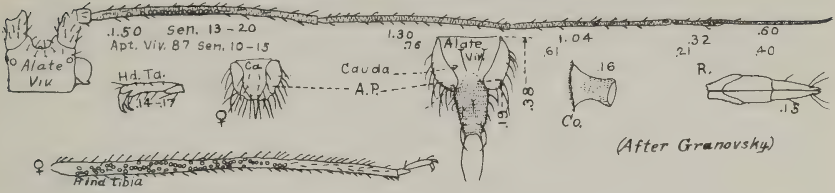

Fig. 66. *Cepegillettea betulifoliae*

Cepegillettea betulifoliae Granovsky, 1928b:115; Gillette and Palmer, 1931:898.

Alate Vivipara. Yellowish green; with head and thorax yellow-brown; antenna annulated with black; legs pale; stigma yellow. Body 2.5 long; antenna 5.22, minutely imbricated, secondary sensoria oval; rostrum attaining 2d coxa. Fore wing with media twice-forked. Other characters as in description for genus.

Apterous Vivipara. About the same as alata except sensoria 10-15 on III.

Male. "Alate."

Collections. On leaves of *Betula* sp. Colorado: Fort Collins. Alate and apterous viviparae Aug. 18; rare.

Cotypes. U.S.N.M., Granovsky and Colo. Agr. Exp. Sta. Collections.

Genus **Chromaphis** Walker

Walker, 1870:2001; Essig, 1912b:763; Baker, 1920a:27; Theobald, 1927:355.

Characters. Frontal tubercles undeveloped; vertex convex. Antenna shorter than body, unguis much shorter than base of VI. Cornicle truncate. Cauda globular or knobbed; anal plate emarginate not bilobed. Hairs on antenna minute; on body of alate vivipara simple and short; on ovipara and nymph moderately long and capitate. Living on leaves and twigs of trees.

Genotype (monotypical), *Lachnus juglandicola* Kaltenbach.

This genus differs from *Panaphis* (considering characters of the genotype, *juglandis*) as follows: Anal plate not bilobed but only slightly indented, hairs on body in alate vivipara not long or numerous but very short and sparse.

Only one species represented in region.

Genotype *Chromaphis juglandicola* (Kaltenbach)

The Walnut Aphid

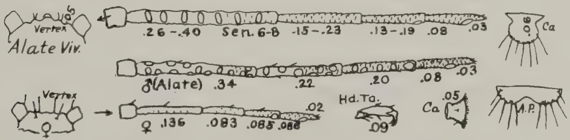

Fig. 67. *Chromaphis juglandicola*

Lachnus juglandicola Kaltenbach, 1943:151.
Callipterus juglandicola, Essig, 1909b:51.
Chromaphis juglandicola, Davidson, 1914b:1; Theobald, 1927:355.

Fundatrix. Alate. Same as summer alate vivipara.

Alate Summer Vivipara. Head, thorax and abdomen pale lemon-yellow to salmon-pink to brownish (sometimes thorax light brown); legs pale with black spot distally on hind femur; antenna annulated; wings hyaline, stigma pale gray; cornicle and cauda pale. Body length 1.6-2.5; hind tibia .65-.70; hind tarsal II .10; antenna .77-1, secondary sensoria on antenna oval, transverse, scattered in single row along entire length of III; cornicle about as wide as long, truncate, tapering, with occasional hairs. Fore wing with radial sector faint, especially at base; media twice-forked. Rostral IV+V .05 long, attaining between 1st and 2d coxae.

Hairs pointed, .05 on vertex; .02 on body; on hind tibia .05, rather numerous; on antenna minute and sparse (in nymph, long and capitate).

Collections. On *Juglans regia,* on leaves. Utah: Brigham City, Salt Lake City, North Salt Lake, Santa Clara, and Green River. Alate viviparae in July and September; at times abundant.

Genus **Euceraphis** Walker

Walker, 1870:2001; Baker, 1920a:28; Theobald, 1927:372.

Characters. Frontal tubercles well developed. Antenna longer than body; unguis not longer than base of VI; secondary sensoria on III narrow, transverse, located near base; absent in aptera; permanent sensorium on VI long, oval and fringed. Cornicle truncate. Cauda somewhat knobbed; anal plate entire or slightly emarginate. Hairs not capitate, even in aptera. Wax glands often present in alata. Fore wing with radial sector distinct. Living on leaves and twigs of trees; usually solitary.

Genotype (set by Walker, 1870), *Aphis betulae* Linnaeus (syn. *Callipterus betulae* Koch)*

Key to Species of Euceraphis

1. Unguis nearly equal to base of VI in length (longer than two-thirds base) (p. 68) .... *betulae*

.... Unguis considerably shorter than base of VI (not longer than two-thirds of base) (p. 68) .... *gillettei*

Genotype *Euceraphis betulae* (Koch)

The European Birch Aphid

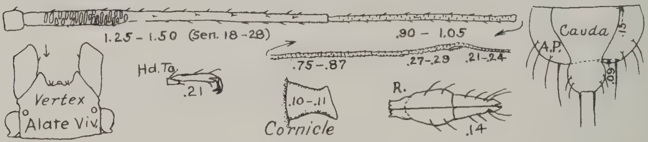

Fig. 68. *Euceraphis betulae*

Callipterus betulae Koch, 1855:217; Buckton, 1881:15.
Euceraphis betulae, Gillette, 1910:371; Baker, 1917a:425; Theobald, 1927:373.

Alate Summer Vivipara. Head and thoracic lobes brown; prothorax and abdomen yellow-green; some with short black dorsal bands on abdominal IV and V; woolly; antenna black or blackish; tibiae and tip of rostrum dusky or brown; tarsi black; cornicle, cauda and anal plate pale; wings hyaline, veins slightly tipped with brown. Length of body 2.70-3; across eyes .57-.60; antenna 4 long, sensoria on III transverse, either broken and crowded or entire; hind tibia 2.1-2.3; hind tarsal II .23-.29; rostral IV+V .13, attaining between 1st and 2d coxae. Cauda knobbed; anal plate slightly emarginate.

Collections. On *Betula alba,* on underside of leaves; solitary, and dropping when disturbed. Colorado: Fort Collins. Generally in northern Utah and southern Idaho. Alate viviparae June 25 to Sept. 25.

Euceraphis gillettei Davidson

Euceraphis sp. Gillette, 1910:371.
Euceraphis gillettei Davidson, 1915:421; Gillette and Palmer, 1931:904.

Alate Vivipara. Head and thorax pale brownish; abdomen pale apple-green to yellowish; without markings; usually with flocculence; antenna annulated; legs pale with tips on tibiae and entire tarsi black; cornicle and cauda pale. Body length 2.5-3.5; hind tibia 2.9-4; antenna 5.2; rostrum attaining between 1st and 2d coxae. Cauda knoblike; anal plate slightly emarginate. Cornicle constricted in the middle and flaring at both base and tip. Three pairs of wartlike to fingerlike dorsal tubercles on abdominal I, II and III.

*Walker named as genotype *Aphis betulae* Linnaeus but evidently had in mind *Callipterus betulae* Koch. This is not strictly according to rule. However, according to Theobald (1927:373) Koch's species has been accepted by most authorities as being the same as Linnaeus'. Linnaeus, however, describes his species as "lacking wings and appendages." This character does not agree with the concept of this genus. The status of the genus *Euceraphis* is being presented to the International Commission on Nomenclature.

Ovipara. Apterous. Brownish with dark transverse dashes or rows of spots on dorsum and lateral areas of abdomen; antenna, tarsi and tips of tibiae black or blackish. Body length 3.4-4; hind tibia 2; antenna 2.50-3.25. Hind tibia with proximal half very slightly swollen and bearing numerous small sensoria which extend over the proximal two-thirds.

Male. Alate. Head and thorax blackish; abdomen pale yellow fading to whitish laterally and with broad dorsal bands; appendages except bases of femora blackish. Body length 2.29; antenna 3-3.70.

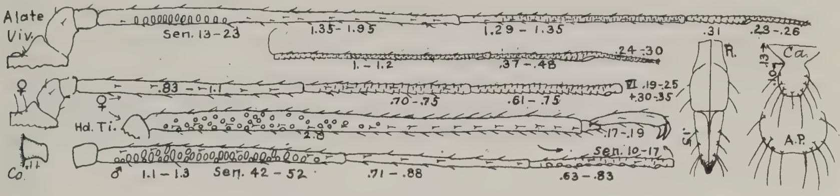

Fig. 69. *Euceraphis gillettei*

Collections. On leaves and tender twigs of *Alnus tenuifolia* and *Betula fontinalis.* Throughout region. Alate viviparae May 29 to Aug. 24, sexuales Sept. 29 to Oct. 20; common.

Type. Possibly U.S.N.M.

This species may be a variety of *E. betulae* (Koch), being separated apparently only by the shorter unguis in proportion to base of VI (not exceeding one-third of the length of base of VI while in *betulae* the unguis exceeds one-third of the base of VI). However, the variations merge together.

Genus **Monellia** Oestlund

Oestlund, 1887:44; Baker, 1920a:29; Gillette and Palmer, 1931:894.

Characters. Frontal tubercles lacking; vertex slightly produced in alata. Antenna without prominent hairs; unguis not longer than base of VI; secondary sensoria elongate-oval. Cornicle a mere pore. Cauda knobbed; anal plate distinctly bilobed. Hairs on body inconspicuous in alata, long and capitate in aptera and nymph. Differs from *Myzocallis* only in character of cornicle. Living on leaves of trees.

Genotype (monotypical), *Aphis caryella* Fitch.

Genotype not described here on account of similarity, in essential generic characters, to *caryae* Monell.

Only one species represented in region.

Monellia caryae (Monell)

The American Walnut Aphid

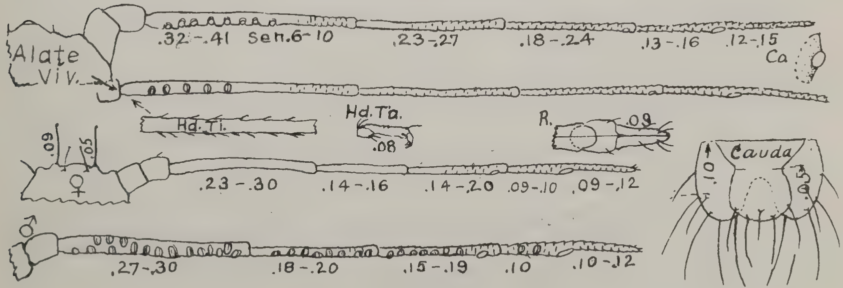

Fig. 70. *Monellia caryae*

Callipterus caryae Monell, 1879:31.
Monellia caryae, Davidson, 1914b:19; Gillette and Palmer, 1931:895.

Alate Vivipara. Pale yellow often with pair of lateral lines on pronotum and dusky spots on abdomen; antenna pale and banded; wings hyaline, stigma pale yellow. Body length 1.3-1.5; hind tibia .80; hind tarsal II .10; antenna 1-1.2, secondary sensoria oval-transverse. Hairs pointed and inconspicuous. Rostrum attaining about to 2d coxa. Fore wing with media twice-forked; radial sector faint. *Nymph.* Hairs on body capitate, .09 long.

Male. Alate. Abdomen with dusky bands on dorsum of each segment. Body length 1.3; hind tibia .55; antenna .90-.97.

Ovipara. Apterous. Marked with speckles. Body length 1.3-1.4; hind tibia .45-.60; antenna .75-.93. Hairs capitate and .09 long on body.

Collections. On leaves of *Carya* sp. and *Juglans regia* and *J.* sp. Colorado: Fort Collins, Boulder, and Denver. Utah: Hurricane, Lake View, Rockville and Vineyard. Alate viviparae June 10 to Sept. 4, sexuales Sept. 24 to Oct. 18; rather common where host occurs.

Type. Davis Collection.

Genus **Myzocallis** Passerini

Passerini, 1860:28; Baker, 1920a:29.

Characters. Frontal tubercles indistinct; vertex produced in alata. Antenna with minute hairs; unguis longer than half of base of VI; secondary sensoria usually absent in aptera. Fore wing usually with radial sector faint and media twice-forked. Hairs usually capitate on body and conspicuous in aptera, and nymph, pointed and inconspicuous in alata. Cornicle short, truncate, and more or less widened at base. Eye with ocular tubercle. Cauda knobbed; anal plate bilobed, not divided. Rostrum moderately obtuse. Living on leaves.

Genotype (fixed by Passerini, 1860), *Aphis coryli* Goeze.

Key to Species of Myzocallis

1. Without spinelike dorsal tubercles 2
.... With spinelike dorsal tubercles 8
2. Fore wing with dark bands (on *Quercus*) 3
.... Fore wing hyaline 4
3. Cornicle dark; unguis 2 or more times as long as base of VI; secondary sensoria 6-10 on III of alata. (p. 72) .... *discolor*
.... Cornicle pale; unguis hardly twice as long as base of VI; secondary sensoria 2-6 on III of alata. (p. 70) .... *alhambra*
4. VI with unguis longer than base 5
.... VI with unguis not longer than base 6
5. VI with unguis about 2-3 times as long as base; III of alata with about 3 secondary sensoria (on *Corylus)* (p. 72) .... *coryli*
.... VI with unguis about twice as long as base; III of alata with 6-10 sensoria (on *Quercus)* (p. 74) .... *punctata*
6. Diameter of cornicle at base at least twice that at tip; body hairs of aptera not noticeably capitate (on *Tilia)* (p. 74) .... *tiliae*
.... Diameter of cornicle but slightly dilated at base; body hairs of aptera noticeably capitate 7
7. Cauda elongated; antenna of aptera with secondary sensoria (on *Ononis* and *Trifolium*) (Not recorded from region) .... *ononidis*
.... Cauda globular; antenna of aptera without secondary sensoria (on *Robinia*). (p. 74) .... *robinae*
8. VI with base about equal to unguis and more than twice as long as cornicle. (p. 75) .... *ulmifolii*
.... VI with base shorter than unguis and barely twice length of cornicle. (p. 73) .... *maureri*

Myzocallis alhambra Davidson

The Western Dusky-winged Oak Aphid

Myzocallis alhambra Davidson, 1920:176; Hottes and Frison, 1931a:255; Palmer, 1936:747.
Myzocallis discolor Monell, (misidentification), Knowlton, 1929c:39.
Myzocallis discolor var. *coloradensis* Gillette and Palmer, 1931:890.

Alate Vivipara. Head and thorax dark; abdomen yellowish and marked above with dusky in broken bands and intersegmental dashes and spots and lateral areas; venter pale or usually with segments V and VI or to VIII with dusky bands, more or less broken; with dorsal tubercles rudimentary to somewhat developed; antenna pale except I and II and VI and tips of IV and V; tibiae except tips, cauda and cornicle including area around its base pale. Fore wing marked with dusky spots too broken for bands but with radial cell clear. Body length 1-2; antenna 1.5-1.8; hind tibia .75-.95; rostral IV+V .08, attaining between 1st and 2d coxae. Cornicle truncate. Cauda wartlike; anal plate well indented.

Ovipara. Apterous, with segments posterior to cornicles extended proboscislike. Yellowish, marked with divided dorsal bands and lateral areas; venter pale; all appendages and cornicle, with area surrounding base, pale. Body covered with long capitate hairs. Length of body 1-1.50; antenna about 1.50; hind tibia .60-.85, considerably swollen for nearly entire length and bearing numerous rather large, flat, indistinct sensoria.

Male. Alate. Head and thorax dark; abdomen yellowish, but mostly covered with broad divided dorsal bands and lateral areas; venter dusky posteriorly to abdominal IV; cornicle, anal plate and cauda pale; tibiae pale except tips; antennal I, II and VI and tips of III, IV and V dusky. Fore wing as in alate vivipara. Body length 1.30-1.50; antenna 1.5-2; hind tibia .60-.85.

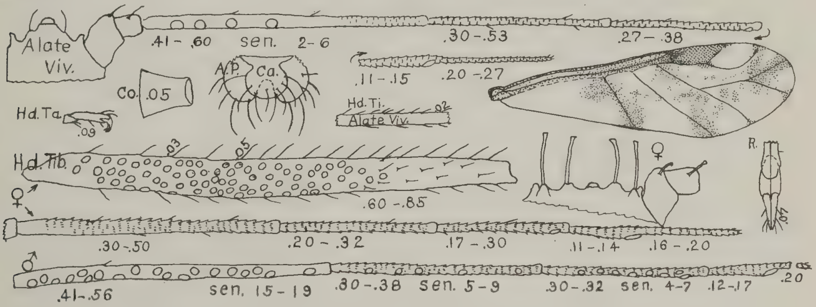

Fig. 71. *Myzocallis alhambra*

Collections. On leaves of *Quercus alba*, *Q. gambelli*, *Q. utahensis* and *Q. macrocarpa*. Colorado: Fort Collins, Glade Park, Glenwood Springs, Salida, Manitou, and Ouray. Utah: Common. Alate vivipara June 6 to Oct. 23, sexuales Sept. 27 to Oct. 23, common.

Type. U.S.N.M. Type of *coloradensis* Gillette and Palmer, U.S.N.M. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Number of sensoria on III of alate vivipara (2-6), length of unguis (1.5, rarely 2 times base of VI), pale color of the cornicle, pale to dusky venter on posterior half of abdomen only, pattern of markings on the fore wing and the absence of strongly developed dorsal tubercles.

This form differs from the original description of *alhambra* in the usual presence of broken dusky dashes on venter of abdominal V, VI, VII and VIII though a few mounted specimens appear immaculate; but about a dozen specimens from California (from Essig Collection) with sensoria from 2-6 on III all showed at least traces of ventral dashes.

This species may, on further study, prove to be the same as *M. discolor;* indeed Monell stated in correspondence that great variation in number of sensoria could sometimes be found even in the two antennae of the same individual. The two forms are here retained as distinct mostly on account of the paler markings of the western specimens studied also considering the absence of specimens so far collected here showing the larger number of sensoria.

Genotype *Myzocallis coryli* (Goeze)

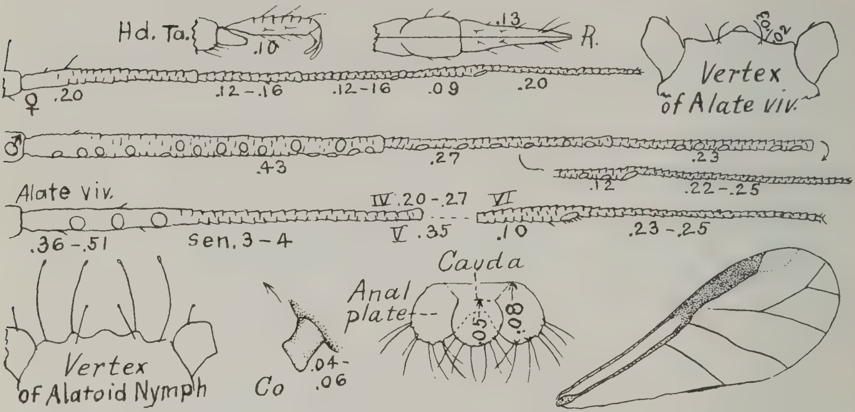

Fig. 72. *Myzocallis coryli*

Aphis coryli Goeze, 1778:311.
Myzocallis coryli, Davis, 1910d:417; Theobald, 1927:332.

Alate Vivipara. Pale yellowish green or white throughout, including legs (except tarsi and tips of tibiae) and rostrum (except tip); wings hyaline. Body length 1-1.5; hind tibia .8-1; antenna 1.3-1.7. Hairs pointed, sparse; on vertex and body .02-.03 long; on antennal III and hind tibia .01-.02. Cauda knobbed; anal plate bilobed. Fore wing with radial sector faint, media twice-forked.

Ovipara. Apterous. Body 1.5 by .7; hind tibia .5, proximal two-thirds swollen and bearing many sensoria; antenna imbricated, .82-1 long; rostrum attaining 2d coxa. Hairs capitate; .07-.15 long on body; on appendages pointed, .03-.05 long.

Male. Alate. Similar to alate vivipara. Antenna bearing sensoria on III, IV, V and VI.

Collections. On *Corylus* sp. and *Alnus* sp., on leaves. Colorado: Fort Collins. Utah: Providence (in a nursery) and Logan. Alate viviparae June 22 and Sept. 24; rare.

Myzocallis discolor (Monell)

The Eastern Dusky-winged Oak Aphid

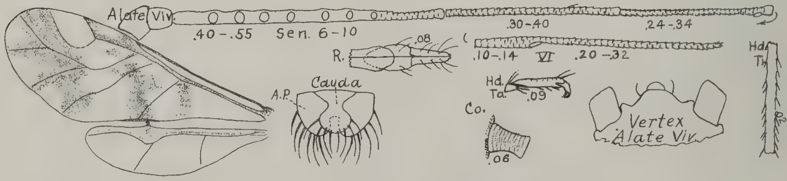

Fig. 73. *Myzocallis discolor*

Callipterus discolor Monell, 1879:30.
Myzocallis discolor, Baker, 1917a:420; Gillette and Palmer, 1931:889.

Alate Vivipara. Head and thorax dark; abdomen greenish or yellowish, spotted on dorsum with dusky to blackish; venter blackish especially on III to VII; cornicle and area surrounding base dusky; antenna annulated; tibiae except tips, cauda and anal plate pale. Fore wing with conspicuous dusky bands, radial cell clear, radial sector very slightly fainter than other veins; media twice-forked. Body length 1.5-2; hind tibia .9-1; antenna 1.80; rostrum attaining between 1st and 2d coxae.

Collections. On leaves of *Quercus* sp. Colorado: Colorado Springs. Alate viviparae June 22; apparently rare.

Type. Davis Collection.

Chief Distinguishing Characters. Characteristic dusky pattern on fore wing, dusky color of venter and of cornicle, number of sensoria (6-10) on III of alate vivipara and length of unguis (2 - 2.5 times length of base of VI).

Myzocallis maureri Swain

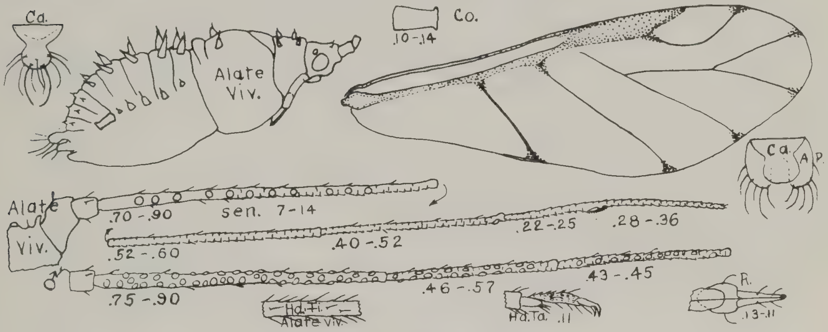

Fig. 74. *Myzocallis maureri*

Myzocallis maureri Swain, 1918b:4.
Myzocallis kiowanica Hottes, 1933:8; Palmer, 1936:732 (new synonymy).
Myzocallis tonkawa Hottes, 1949c:105 (new synonymy).

Alate Vivipara. Abdomen pale green; antenna, lighter on I and proximal portion of all segments, distal portions dark; tibiae, especially knees and tips of tibiae and entire tarsi dusky to blackish; cauda, cornicle and dorsal tubercles pale. Dorsal tubercles present on abdominal I, II, III and IV, about .10-.12 long; lateral tubercles present on abdominal I, II, III and IV. Wings hyaline but fore wing with veins tipped and anal vein heavy. Body length 1.60-2; across eyes .43-.45; antenna 2.20-2.60; hind tibia 1.40-1.50; hind tarsal II .12; rostrum attaining between 1st and 2d coxae. Cornicle cylindrical or slightly tapering and with flange. Cauda knobbed; anal plate divided.

Male. Alate. Similar to alate vivipara except antennal characters, as figured.

Collections. On *Quercus gambelli, Q. macrocarpa* and *Q.* sp. on leaves. Colorado: Colorado National Monument (near Grand Junction) and Glade Park. Utah: Various localities in central and northern part of state. Alate viviparae and alate males Oct. 20 and 27; rather common.

Type. Possibly U.S.N.M. *M. kiowanica* Hottes and *M. tonkawa* Hottes, U.S.N.M.

Chief Distinguishing Characters: Length of III, number of sensoria on III (5 - 13), dorsal tubercles moderately well developed (.10 - .12 long) on abdominal I to IV inclusive, pale cornicle ond dorsal tubercles and wing characters, (as shown on figure).

Swain (1919: 178) declares *maureri* a synonym of *M. californica* Baker but as the unguis is only .16 long in Baker's species it seems impossible to accept this decision.

On *Quercus gambelli* several collections were taken in Utah at Provo, Emigration Canyon and Gravel Springs which differ somewhat from the above description in smaller measurements as follows: Body 1.40 - 2.35; hind tibia .90 - 1.40: antenna 1.95 - 2.10, III .63 - .73, with 6 - 11 sensoria, IV .36 - .43, V .32 - .45. VI .20 - .21 - .25; cornicle .10 - .12. As these characters, as well as those given for *M. kiowanica* and *tonkawa*, merge with those of *maureri* it seems impossible to draw a satisfactory line of distinction and seems to indicate one variable species.

Myzocallis punctata (Monell)

The Clear-winged Oak Aphid

Callipterus punctatus Monell, 1879:30.
Myzocallis punctata, Gillette and Palmer, 1931:890.

Characters. Similar to *M. discolor* or more especially to *alhambra,* differing in the absence of the banding of the forewing, leaving only the tips of the veins slightly smoky and the absence of dusky markings on body.

Sexuales. Similar to those of *M. alhambra* even in body markings, differing only in the wing markings of the male which consist of the dusky vein tips.

Collections. On *Quercus alba, Q. macrocarpa,* and *Q.* sp., on leaves. Colorado: Fort Collins and Manitou. Utah: Glendale. Alate viviparae May 25 to Oct. 20, sexuales Oct. 18 to 20; fairly common.

Type. Davis Collection.

Myzocallis robiniae (Gillette)

The Locust Aphid

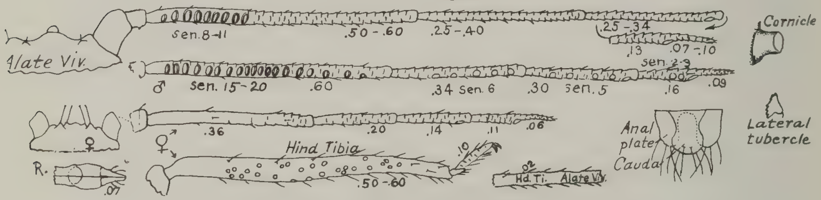

Fig. 75. *Myzocallis robiniae*

Callipterus robiniae Gillette, 1907:395 and 1908b:20.
Myzocallis robiniae, Gillette and Palmer, 1931:891.

Alate Vivipara. Yellow or greenish yellow; with a pair of dorsal and of lateral powdery lines or rows of spots, one on each segment extending from antennal bases to tip of abdomen; antenna annulated; tarsi, tips of tibiae, a spot near distal end of hind femur, and tip of rostrum black; cornicle and cauda pale. Wings hyaline with dusky spot at base of stigma; fore wing with radial sector faint, media twice-forked. Body length 1.6-1.9; hind tibia .75-1; antenna 1.3-1.6. Hairs inconspicuous except on cauda and anal plate; long and capitate in nymphs. Abdominal I to V each with lateral tubercles.

Ovipara. Apterous. Pale green with numerous dusky spots, each bearing a long capitate hair, and two dorsal rows of short dashes also lateral areas blackish; antenna after III and distal half of tarsi blackish; legs more or less dusky. Abdominal VI to VIII prolonged forming an ovipositor. Body length 1.9; antenna .95-1.1; hind tibia .50-.60, somewhat swollen on proximal two-thirds and bearing scattered sensoria along nearly entire length.

Male. Alate. Head and thorax black; abdomen light green with short dorsal bands and lateral areas, usually on all segments, black; white powdery dorsal and lateral lines as in alate vivipara; antenna brownish, somewhat annulated; legs pale with distal half of tarsi black. Body length 1.5; antenna 1.1-1.6. Abdominal I to V each with lateral tubercles.

Collections. On leaves of *Robinia neomexicana* and *R. pseudo-acacia.* Colorado: Fort Collins, Boulder, Denver, Trinidad, Sugar City, and Grand Junction. Utah: Throughout state. Alate viviparae June 10 to Oct. 2, sexuales Sept. 21 to Nov. 9; common.

Type. U.S.N.M., No. 41935. Paratypes, Colo. Agr. Exp. Sta. Collection.

Myzocallis tiliae (Linnaeus)

The Linden Aphid

Aphis tiliae Linnaeus, 1758:452.
Callipterus (Eucallipterus) tiliae, Davis, 1909a:33.

Alate Vivipara. Yellow; with black lateral vittae on head and thorax, continued on abdomen by medially broken black bands and lateral areas; antenna annulated with I, II and III black. Fore wing with anterior margin and tips of veins smoky, median and anterior portion of stigma paler; legs mostly pale with femora and knees dark; cornicle slightly dusky; rostrum, cauda and anal plate yellow. Body length 2; hind tibia .9; hind tarsal II .15; antenna 2-2.19. Frontal tubercles slightly developed; vertex with a pair of tubercles close to anterior margin, each with one or two hairs. Hairs pointed, inconspicuous, .01-.02 long on antenna and body.

Ovipara. Apterous. Head and prothorax, medially broken bands and lateral areas on abdomen black; antennal I, II and distal half of III, IV, V and VI, femora, knees, tarsi and cornicle dark; tibiae, cauda, anal plate and rostrum pale. Body length 1.7; antenna 1.30; hind tibia .70, proximal half or more considerably swollen and bearing numerous irregular-sized sensoria. Hairs simple, short and inconspicuous. Cauda knobbed but anal plate entire.

Male. Alate. Body length 1.5; hind tibia .80; antenna 1.9.

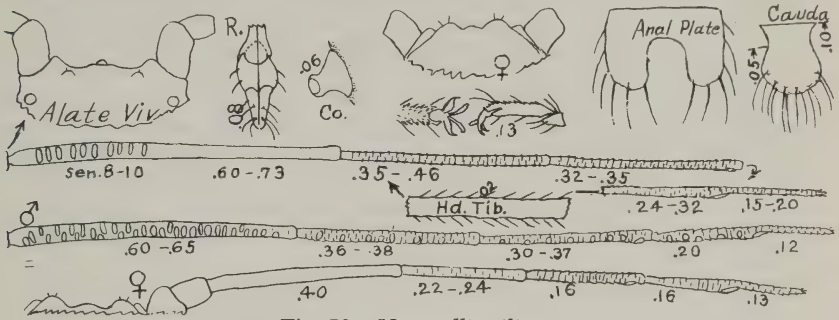

Fig. 76. *Myzocallis tiliae*

Collections. On leaves of *Tilia* sp. Utah: Logan, Providence and Provo. Alate viviparae in September and Oct. 3, oviparae Oct. 3; rather common.

This species differs from the genotype as follows: Inconspicuous hairs on body of aptera and nymph, slight antennal tubercles and dilated cornicle base. It has been placed in several different genera by different authorities.

Myzocallis ulmifolii (Monell)

The Elm Leaf Aphid

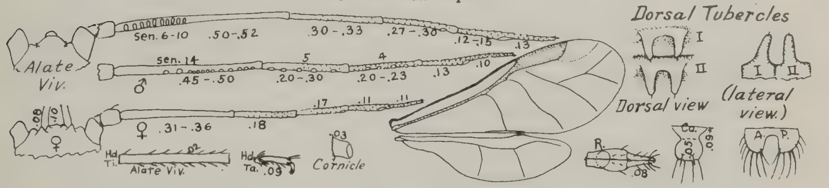

Fig. 77. *Myzocallis ulmifolii*

Callipterus ulmifolii Monell, 1879:29.
Myzocallis ulmifolii, Gillette and Palmer, 1931:893.

Alate Vivipara. Pale yellow to greenish, with white bordered dusky vittae on head and pronotum; abdomen with rows of white specks forming broken vittae, and with dusky speckles; legs pale; wings hyaline. Body length 1.5-1.7; hind tibia .70-.80; hind tarsal II .11; antenna 1.45-1.55, secondary sensoria transverse, elongate. Hairs minute; cauda knobbed; anal plate bilobed; cornicle obliquely truncated. Rostral IV+V, .09 long, hardly attaining 2d coxa. Fore wing with radial sector faint; media twice-forked. Two pairs of fingerlike dorsal tubercles on abdominal I and II and smaller ones on succeeding segments.

Ovipara. Apterous. Body length 1.50, with drawn out ovipositor; hind tibia .60; antenna 1.05; hind tibia considerably swollen along almost entire length and bearing numerous sensoria. Hairs capitate and .08-.10 long on body; minute on antenna.

Male. Alate. Body length 1.30; hind tibia .70; antenna 1.20-1.30.

Collections. On leaves of *Ulmus americana.* Colorado: Fort Collins, Boulder, Denver and La Junta. Wyoming: Powell. Utah: Collinston, Fielding, Providence, Salt Lake City, Provo and Salem. Alate viviparae July 28 to Oct. 7, sexuales Sept. 3 to Oct. 23; abundant at times.

Type. Davis Collection.

Chief Distinguishing Characters. In alate vivipara dainty white lines on the dorsum, decidedly transverse secondary sensoria on III and two pairs of fingerlike dorsal tubercles on the abdomen.

This species resembles very closely *M. pulchellus* Glendenning (1929:237) but differs as follows: Longer unguis and fewer sensoria on III. *M. pulchellus* has unguis hardly as long as half base of VI and 18 - 25 sensoria on III of alate vivipara.

Genus **Neosymydobius** Baker

Baker, 1920a:30.

Characters. Frontal tubercles slightly developed. Antenna with inconspicuous hairs, unguis not longer than base of VI (except in *annulatus*); secondary and primary sensoria oval to circular; present in aptera. Hairs on body simple, somewhat spinelike. Imbrications on antenna and cornicle minutely denticulate. Cornicle truncate, somewhat broader at base and with flange. Cauda semicircular, broader than long; anal plate slightly indented. Living on bark of twigs of trees.

Genotype (monotypical), *Symydobius albasiphus* Davis.

Key to Species of Neosymydobius

1. VI with unguis twice as long as base of segment. (p. 76).......................................*annulatus*
.... VI with unguis shorter than twice length of base of segment....................................... 2
2. III longer than 5 times unguis. (p. 77).......................................*intermedius*
.... III shorter than 5 times unguis. (p. 76).......................................*albasiphus*

[Genotype *Neosymydobius albasiphus* (Davis)]

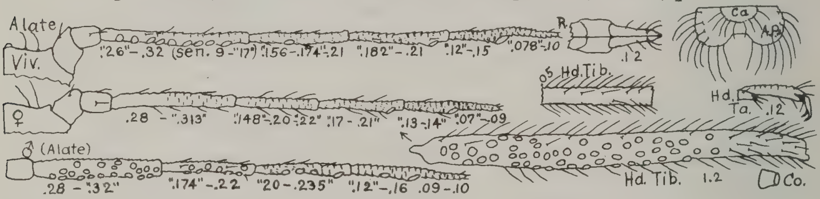

Fig. 78. *Neosymydobius albasiphus*

Lachnus quercifoliae Fitch, (misidentification), Thomas, 1879:118.
Symydobius albasiphus Davis, 1914:226.

Alate Vivipara. Head and thorax dark; abdomen brown with median line "whitish yellow"; antenna annulated; legs dusky; cauda, cornicle and anal plate pale; wings hyaline with slight duskiness at the tips of veins. Body length 1.4-1.6; across eyes .41; antenna ".95"-1.10; hind tibia 1.05-1.10; rostrum attaining about to 2d coxa. Hairs simple, fine, rather sparse; .05 long on vertex and body. Cauda rounded; anal plate indented. Cornicle truncate, very short and inconspicuous. Lateral tubercles present, sensorialike in appearance.

Ovipara. Apterous. Body length 1.4-"2"; across eyes .42; antenna about 1 long; hind tibia .90. Abdomen somewhat drawn out into an ovipositor. Hind tibia considerably swollen and bearing large, scattered sensoria over four-fifths of length.

Male. Alate. Color markings same as in alate vivipara. Antenna with sensoria on III, IV and V.

Host. On leaves of *Quercus alba* (Not yet taken in region).

Type. Davis Collection.

Neosymydobius annulatus (Koch)

Chaitophorus annulatus Koch, 1854:7.
Calaphis annulata, Gillette and Palmer, 1931:901.

Alate Vivipara. Pale yellowish green marked with brown on head and thorax and with dusky bands on abdominal segments; cornicle, cauda and anal plate, rostrum and antenna except proximal portion of III dusky; 3d pair of legs dusky, 1st pair mostly pale yellowish;

wings hyaline with veins bordered and tipped with dusky, stigma pale medially, radial sector faint, especially proximally. Body length 2; hind tibia .75-.9; hind tarsal II .12; antenna 1.3. Hairs on vertex, .05, on body hardly evident; on hind tibia .05 long. Rostrum obtuse, IV+V .10 long attaining 2d coxa. Tubercles on lateral margins of all abdominal segments and a pair on occiput and on vertex. Imbrications on cornicle and dorsum of body denticulate.

Apterous Summer Vivipara. Same in color and measurements as alate vivipara except as figured. Hairs pointed, curved, .10-.15 long on vertex and body; .10-.15 on hind tibia and .02 on antenna.*

Ovipara. Apterous. Same as apterous vivipara except with hind tibia very dark, slightly swollen on proximal half and bearing numerous rather large weak sensoria. Abdomen not noticeably or only slightly drawn out to form ovipositor.

Male. Alate. Same as alate vivipara except III bearing 13-15 sensoria.

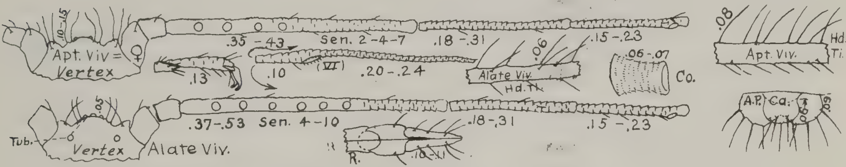

Fig. 79. *Neosymydobius annulatus*

Collections. On leaves of *Betula alba* and *papyrifera.* Colorado: Fort Collins, Denver, Greeley and Boulder. Utah: Fielding, Ogden, Hopper and Logan. Apterous and alate viviparae July 4 to Oct. 8, oviparae Sept. 16 to Oct. 3, males Oct. 3; rather rare.

Our specimens differ slightly from Koch's description in color in being rather lighter on body and darker on legs.

This species does not entirely fit *Neosymydobius;* disagreeing in the presence of more distinct frontal tubercles and longer unguis.

Neosymydobius intermedius Gillette and Palmer n. comb.

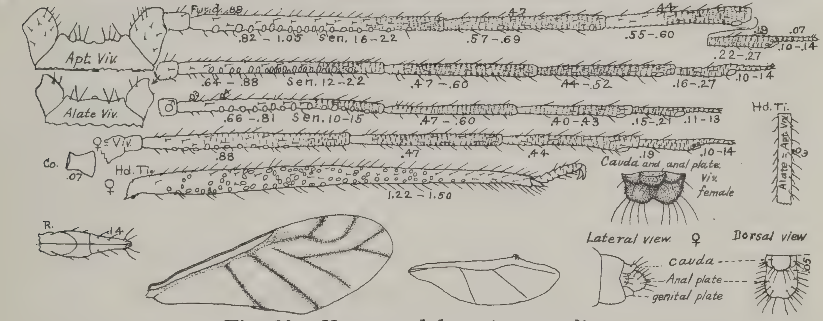

Fig. 80. *Neosymydobius intermedius*

Symydobius intermedius Gillette and Palmer, 1930:544 and 1931:896.

Fundatrix. Tawny olive to greenish with dusky crossbands, often coalescing, on abdomen; cornicle pale; antenna annulated; legs dusky to black. Body length 2.66; hind tibia 1.50; antenna 2.2, III .89, IV .47, V .44, VI .19+.07, sensoria on III 8-13. Other characters as in apterous summer vivipara.

Alate Vivipara. Color of body same as fundatrix; fore wing with veins heavily bordered, the media and cubitus most broadly bordered. Body length 2; hind tibia 1.4; hind tarsal II .20; antenna 2.4; rostrum attaining 2d coxa.

*Koch (op. cit., Fig. 10 and 11) shows long hairs on antennae of both alate and apterous females but describes (p. 8) "antennae without bristles."

Apterous Summer Vivipara. Color same as fundatrix. Body length 2.5; hind tibia 1.8; hind tarsal II .20; antenna 3; rostrum rather broad, obtuse, attaining 3d coxa. Hairs on body .05-.08, somewhat spinelike; on antenna fine, length about equal to or 1.5 times diameter of III. Imbrications on antenna and cornicle finely denticulate.

Ovipara. Apterous. Body length 2.8; antenna 2.50. Abdomen somewhat drawn out to form ovipositor. Proximal half of hind tibia slightly swollen and bearing sensoria.

Male. Apterous. Dusky brown. Body length 1.95; hind tibia 1.1; antenna 2.

Collections. On bark of twigs of *Betula fontinalis* and *Betula* sp. Colorado: Fort Collins, Boulder, Estes Park, Stove Prairie (near Bellvue) and Crawford. Idaho: Mink Creek. Utah: Woodruff. Fundatrices April 7, apterous summer viviparae June 2 to Oct. 7, alate viviparae June 2 to Aug. 9, oviparae Sept. 25 to Oct. 13, males Oct. 15; fairly common.

Type. U.S.N.M., No. 42819. Paratypes, Colo. Agr. Exp. Sta. Collection.

From *N. americanus* (Baker) this species is separated by the shorter unguis (equal to base of VI in *americanus*).

Genus **Oestlundiella** Granovsky

Granovsky, 1930:63.

Characters. Frontal tubercle distinct but not greatly enlarged. Antenna longer than body; secondary sensoria subcircular, present on III of alate and apterous viviparae. Cornicle truncate with enlarged distal end and with distinctly mammiform base. Cauda spatulate; anal plate with U-shaped cleft. Hairs inconspicuous, blunt or slightly capitate. Fore wings with radial sector evident, media twice-forked. Body somewhat woolly. Living on leaves and twigs of trees.

Genotype (monotypical), *Euceraphis flava* Davidson.

Only one species represented in region.

Genotype *Oestlundiella flava* (Davidson)

The Alder Aphid

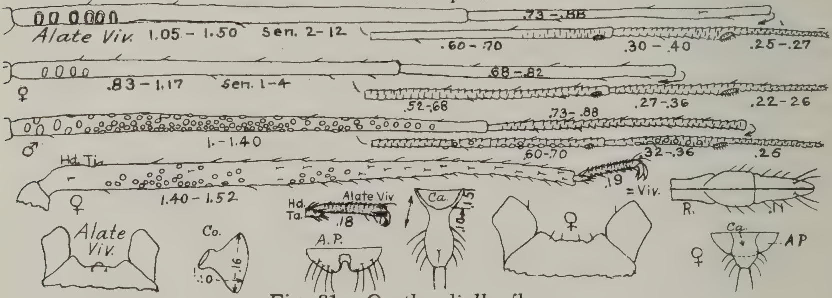

Fig. 81. *Oestlundiella flava*

Euceraphis flava Davidson, 1912:406; Knowlton 1929a:4.
Oestlundiella flava, Gillette and Palmer, 1931:903.

Alate Vivipara. Pale yellow; more or less woolly; with cornicles and a pair of dorsolateral vittae from head to abdomen dark brown; lateral areas on abdomen dusky; cornicle black; cauda pale; antenna annulated; legs pale dusky with tips of tibiae and entire tarsi black. Wings hyaline, stigma pale. Body length 3.3; hind tibia 2.5-3.2; hind tarsal II .20; antenna 4; rostral IV+V .11, attaining between 1st and 2d coxae. Hairs inconspicuous.

Ovipara. Apterous. Yellow; with 2 pairs of dorsal to lateral longitudinal rows of dark brown spots; with tufts of long threads on venter of abdominal V and VI. Body length 1.6-2; hind tibia 1.1-1.9; antenna 3.

Male. Alate. Dorsum of head and prothorax light dusky. Color markings similar to alate vivipara. Body length 1.5-1.9; hind tibia 1.60-1.65; antenna 3.4.

Collections. On leaves of *Alnus rhombifolia, A. tenuifolia,* and *A.* sp. Colorado: Fort Collins, Boulder and Loveland foothills and Poudre Canyon. Utah: American Fork Canyon and Hanna. Alate viviparae June 7 to Oct. 13, sexuales Oct. 11 and 13; rather rare.

Genus **Panaphis** Kirkaldy

Callipterus Koch, 1855:208 (preoccupied); Theobald, 1927:360; Baker, 1920a:27.
Callaphis Walker, 1870:2000 (preoccupied by *Calaphis* Walsh).*
Ptychodes Buckton, 1881:39 (preoccupied).
Panaphis Kirkaldy, 1904b:279 n.n. for *Ptychodes* Buckton.
Callipterinola Strand, 1928:47.

Characters: Body fusiform. Head convex and broad, tufted with bristles, frontal tubercles undeveloped. Antenna six-segmented, VI with unguis shorter than base. Cauda knobbed, small, pilose; anal plate divided. Cornicle small, trumpet-shaped bearing long hairs. Legs robust, short and pilose. Rostrum very short and stout. Fore wing with radial sector faint.
Genotype (fixed by Passerini, 1860), *Aphis juglandis* Goeze (=*Aphis juglandis* Frisch).

[Genotype *Panaphis juglandis* (Goeze) n. comb.]

The Dusky-veined Walnut Aphid

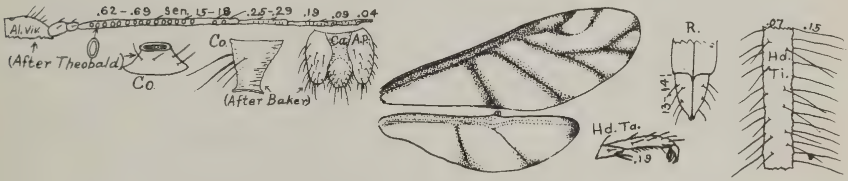

Fig. 82. *Panaphis juglandis*

Aphis juglandis Goeze, 1778:311.
Lachnus juglandis Frisch, Kaltenbach, 1943:150.
Callipterus juglandis Frisch, Koch, 1855:222; Theobald, 1927:360.
Ptychodes juglandis Frisch, Buckton, 1881:40.
Callipterinola juglandis Goeze, Gillette and Palmer, 1931:887.

Alate Vivipara. Head and thorax mostly brown to black; abdomen bright yellow with brown to black bands and lateral areas; cornicle brown at least at base; antenna yellow with tips of segments dark; legs yellow except tarsi, tip of hind tibia and of hind femur; cauda and anal plate yellow. Fore wing with costal area dark and veins tipped and bordered with dusky. Body length 2-3.5; hind tibia 2; hind tarsal II .18; antenna 1.35. Hairs simple, fine; on vertex and body .12 long; on III about 9 in number, .05-.08 long.

Ovipara. Apterous. Yellow to yellow-green; head and thorax dark; body with 4 rows of dark spots. Rostrum thick, not attaining 1st coxa. Hind tibia long, dark except yellow apex, hairy, with many sensoria on dark area.

Male. Alate. Similar to alate vivipara.

Host. Juglans sp., on upper surface of leaves. (Not recorded from region.)

Data for above description taken from descriptions and figures by Buckton, Koch and Theobald (op. cit.) and from specimens determined by Hille Ris Lambers.

Subtribe **Saltusaphina** n.n.

Saltusaphidina Baker, 1920a:25.

Characters. Body narrow. Ocular tubercle lacking. Cauda knobbed; anal plate bilobed. Imbrications on antenna denticulate. Fore wing with radial sector distinct; hind wing with cubitus obsolete. Rostrum obtuse, very broad, segment V obsolete.

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*In accordance with Opinion 147.

Key to Genera of Saltusaphina.

1. Body hairs flabellate 2
.... Body hairs pointed. (p. 82) .... *Thripsaphis*
2. Terminal tergite bifid, bearing cylindrical to pointed hairs. (p. 81) .... *Saltusaphis*
.... Terminal tergite not bifid, bearing flabellate hairs. (p. 80) .... *Iziphya*

Genus **Iziphya** Nevsky

Nevsky, 1929b:314.

Characters. Head and thorax elongated. Eye without ocular tubercle. Antenna six-segmented, with spinelike hairs. Hairs on body and head flabellate to heavy-blunt, usually curved, arising from large tubercles. Cornicle truncate, on broad hairy cone. Cauda cordiform; anal plate divided. Tergite VIII not bilobed but heavily tuberculate.

Genotype (monotypical), *Iziphya maculata* Nevsky.

Key to Species of Iziphya.

1. Cornicle set on raised cone. (p. 80) .... *maculata*
.... Cornicle not set on raised cone. (p. 80) .... *flabella*

[Genotype *Iziphya maculata* Nevsky]

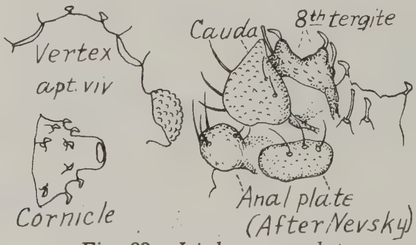

Fig. 83. *Iziphya maculata*

Iziphya maculata Nevsky, 1929b:314.

Apterous Vivipara. Greenish yellow, with dusky specks and blotches on dorsum, tending to form two vittae, transverse band between cornicles and on tergite VIII. Body length 1.3-1.7; head long; vertex slightly convex; antenna 1.4, III .40, IV .21; V .24; VI .14+.26; cornicle with cylindrical portion .06 long, .05 wide and conical portion .05 long and .16 in diameter at base; cauda .10.

Hairs on body throughout, flabellate, set on large tubercles, .03 long; on antenna setigerous; on legs cylindrical or setigerous. Anal plate divided; tergite VIII somewhat covering cauda and bearing flabellate hairs on large tubercles.

Host. Cynodon dactylon, on leaves. Data for above description and drawings obtained from Nevsky (op. cit.) (Not taken in region.)

Iziphya flabella (Sanborn)

Chaitophorus flabellus Sanborn, 1904:37.
Callipterus flabellus, Gillette, 1909a:120.
Iziphya flabella, Gillette and Palmer, 1931:908.

Apterous Vivipara. Pale yellowish green, with dusky specks and blotches tending to form vittae, especially on thorax and a pair of dorsal patches on abdominal IV and V; femora and knees dark; tibiae and cauda pale; tarsi and cornicle dusky. Body length 1.5-2; hind tibia .47-.54; hind tarsal II .14; antenna 1.4-1.6. Hairs flabellate, set on tubercles which are fairly conspicuous on terminal tergites.

Alate Vivipara. Pale yellow-green with dark vittae on head and pronotum; meso- and metathorax black above and below; abdomen with irregular blotch on III, IV and V, a pair of blotches on VII, and VIII dark; femora, knees, tarsi and cornicle black; tibiae and cauda pale; fore wing with veins heavy, somewhat bordered and tipped with smoky. Measurements same as in aptera. Antenna with imbrications finely denticulate, without evident hairs; secondary sensoria, round, fairly large to minute; rostrum obtuse, barely surpassing 1st coxa. Ocular tubercle lacking. Cornicle cylindrical to truncate on a circular base which bears flabellate hairs; entire surface finely denticulate. Tergite VIII rounded, entire, hardly projecting over cauda; cauda knobbed, distal end truncate or bluntly rounded as usually seen, but really ending in upturned point; anal plate bilobed. Hairs flabellate to heavy-blunt and curved, on small tubercles on body excepting on vertex, cauda, anal plate, and ventral sides of tibiae where they are pointed. Fore wing with media twice-forked; hind wing with cubital vein absent.

Ovipara. Apterous. Color same as vivipara or slightly deeper sulfur-yellow and lighter dusky markings. Body length 1.3-2; antenna 1.2-1.4. Flabellate hairs on body replaced by blunt stout hairs posterior to cornicles; cornicle base surrounded by dusky area. Hind tibia swollen and bearing scattered large sensoria on nearly entire length.

Male. Apterous. Color similar to ovipara. Hairs as in apterous vivipara except posterior to cornicles flabella replaced by capitate hairs. Body length 1.22; antenna .80-1.20, hind tibia .35-.48.

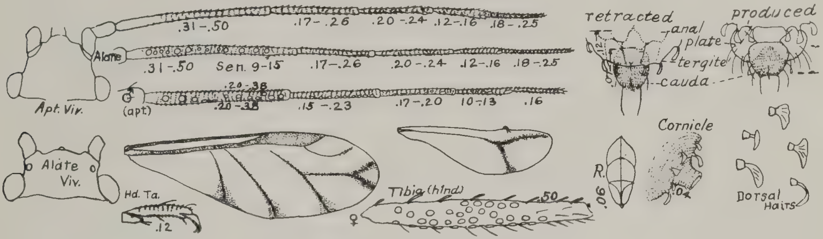

Fig. 84. *Iziphya flabella*

Collections. On leaves of *Carex* sp. (small species in low meadows); with jumping habits. Colorado: Fort Collins. Utah: Richfield, Logan, Syracuse, Laketown, Ideal Beach and Glenwood. Wyoming: Lingle and Centennial. Idaho: Fish Haven. Apterous summer viviparae April 28 to Sept. 28, alate viviparae April 28 to June 11, also Sept. 4, oviparae Oct. 27, males Oct. 7 to 29; common.

Cotypes: Oklahoma Agr. Exp. Sta. Collection.

Genus *Saltusaphis* Theobald

Theobald, 1915:138; Baker, 1920a:31.

Characters. Body narrow; head long and broad. Frontal and ocular tubercle lacking. Antenna six-segmented. Legs short; 1st and 2d femora thickened. Hairs on body flabellate except on tergite VIII where they are cylindrical. Cornicle truncate on a flat circular base. Fore wing with media twice-forked; hind wing with cubitus obsolete. Imbrications denticulate on antenna, cornicle and cauda. Living on leaves of Cyperaceae.

Genotype (monotypical), *Saltusaphis scirpa* Theobald.

Key to Species of Saltusaphis

1. Vertex not markedly produced (p. 82)........*scirpa*
.... Vertex more or less produced........2
2. III longer than 1 (p. 81)........*elongata*
.... III much shorter than 1 (p. 82)........*virginica*

Saltusaphis elongata Baker

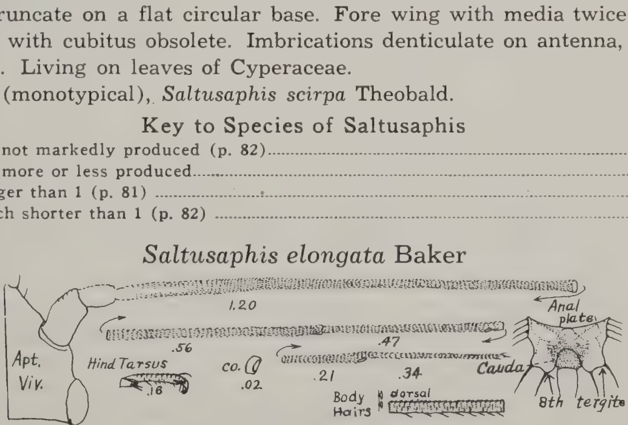

Fig. 85. *Saltusaphis elongata*

Saltusaphis elongata Baker, 1917b:4; Hottes and Frison, 1931a:265; Palmer, 1936b: 733.

Apterous Vivipara. Body length 2; hind tibia .80; antenna 2.55; cauda .10 on median line. Vertex much produced and acute. Anal plate deeply bilobed. Hairs on body flabellate, minute.

Collection. On sedge (probably *Scirpus* sp.). Colorado: Skyway, Grand Mesa (Mesa Co.). A single apterous vivipara Aug. 19; rare.

This specimen differs from Baker's cotypes (oviparae) in longer antenna and hind tibia and smaller body but agrees with the produced, acute vertex and other characters. The differences may be due to the type specimens being oviparae instead of viviparae.

Cotypes. U.S.N.M.

[Genotype *Saltusaphis scirpa* Theobald]

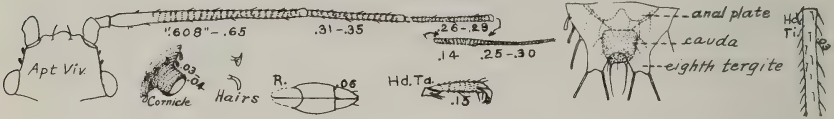

Fig. 86. *Saltusaphis scirpa*

Saltusaphis scirpa Theobald, 1915a:138; Gillette and Palmer, 1931:906.

Apterous Vivipara. Yellowish, with dusky vittae on head and speckles on abdomen; legs mostly yellowish; cornicle dusky. Body 2-2.5; abdomen hardly broader than thorax; hind tibia .65; hind tarsal II .15; antenna 2; rostrum obtuse, attaining between 1st and 2d coxae. Imbrications on antenna denticulate. Hairs flabellate on body except on vertex, tergite VIII, cauda and anal plate.

Alate Vivipara. Same as apterous vivipara except sensoria on III 15-17 in a single row on proximal three-fifths. Fore wing with media twice-forked. Hind wing with cubitus obsolete.

Host. Leaves of *Scirpus* sp.; with jumping habits. (Not recorded from region).

Data for above description and drawings were obtained from description by Theobald and from paratypes.

Type. British Museum. Paratypes, Colo. Agr. Exp. Sta. Collection.

Saltusaphis virginica Baker

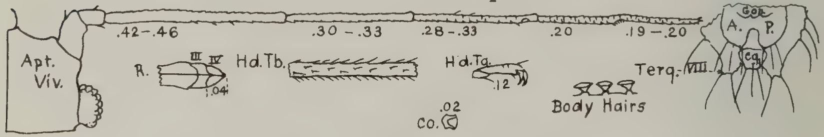

Fig. 87. *Saltusaphis virginica*

Saltusaphis virginica Baker, 1917a:7.

Apterous Summer Vivipara. (Mounted in balsam), immaculate; dusky only on tarsi, antenna beyond proximal portion of III and extreme tip of rostrum. Body length 2.15-2.2; across eyes .45; antenna 1.80; hind tibia .65-.70; rostrum attaining beyond 1st coxae. Hairs on body flattened mushroom-shaped, minute and numerous; on vertex spinelike and pointed. Tergite VIII somewhat indented; anal plate divided; cauda knobbed.

Collections. On sedge. (*Scirpus* sp.) Utah: Logan. Apterous viviparae Sept. 2; rare.

This species is peculiar in the mushroom-shaped hairs on the body of the apterous vivipara.

Type. U.S.N.M.

Genus **Thripsaphis** Gillette

Gillette, 1917c:193; Baker, 1920a:30; Gillette and Palmer, 1931:909.

Characters. Body very long, flat and slender. Frontal and ocular tubercles not evident. Antenna much shorter than body, six-segmented, secondary sensoria round, permanent sensoria with cilia. Rostrum very broad and short. Cornicle mere ring on abdominal VI. Cauda knobbed; anal plate divided in all

forms. Body with spinelike hairs. Fore wing with media usually twice-branched, frequently deformed; hind wing with cubitus faint or absent. Living on leaves and stems of *Gramineae* and *Cyperaceae*.
Genotype (fixed by Gillette, 1917), *Brachycolus ballii* Gillette.

Key to Species of Thripsaphis

1. Vertex of aptera not with wartlike projection........ 2
.... Vertex of aptera with wartlike projection........ 3
2. Vertex of aptera moderately convex; antenna of aptera without secondary sensoria (p. 83) .... *ballii*
.... Vertex of aptera strongly convex; antenna of aptera with secondary sensoria (p. 83) .... *producta*
3. Vertex with wartlike projection rising abruptly; III of aptera with sensoria (p. 84) .... *verrucosa*
.... Vertex with wartlike projection not rising abruptly; III of aptera not bearing sensoria (p. 84) .... *utahensis*

Genotype *Thripsaphis ballii* (Gillette)

The Thrips Aphid

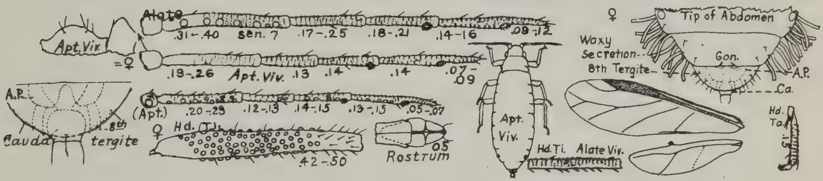

Fig. 88. *Thripsaphis ballii*

Brachycolus ballii Gillette, 1908b:67 and 1909a:119.
Thripsaphis ballii, Gillette, 1917c:194; Gillette and Palmer, 1931:909.

Apterous Vivipara. Head and thorax dusky; abdomen pale greenish with crossbands and speckles; slightly pulverulent; legs slightly dusky. Body 2-2.5 by .75-.80; dorsoventrally compressed thripslike; vertex rounded; frontal tubercles not developed; antenna imbricated; body surface very minutely denticulate. Hind tibia .40-.70; antenna .80; cauda .09 entire length, .04-.05 from neck. Legs stout.

Alate Vivipara. Color same as in apterous vivipara. Body length 1.7 by .5; hind tibia .55; antenna 1.05. Hairs spinelike, minute, about .01-.02 long on antenna and body. Cornicle a mere pore on abdominal VI. Rostrum very broad, barely surpassing 1st coxa. Anal plate bilobed; tergite VIII broadly rounded and projecting posteriorly usually covering cauda.

Ovipara. Same as apterous vivipara except with tufts of secretion on venter of tip of abdomen and hind tibia which is swollen and bearing numerous sensoria on nearly entire length.

Male. Apterous. Body length 1.10; hind tibia .30; antenna .80; sensoria present on III and V.

Collections. On leaves and stems of *Carex nebraskensis*. Colorado: Fort Collins and Rocky Ford. Utah: Henefer. Apterous summer viviparae April 29 to Sept. 17, alate viviparae May 27 to July 13, oviparae Oct. 30 to Nov. 9, males Oct. 14 to 17; common.

Type. U.S.N.M., No. 41933. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Short antenna, number of sensoria (about 7) on III of alate vivipara and (none) on III of aptera, moderately produced vertex, absence of the cubital vein in hind wing, short and broadly rounded tergite VIII and stout femora of apterous vivipara.

Thripsaphis producta Gillette

Thripsaphis producta Gillette, 1917c:196; Gillette and Palmer, 1931:910.

Apterous Vivipara. Blackish, due to heavy banding and mottling. Dorsal surface bluntly denticulate to papulate; appendages black. Body 2 by .7; hind tibia .45-.50; antenna .95-1.2.

Alate Vivipara. About the same in color and measurements as in apterous vivipara or with appendages slightly longer. Secondary sensoria on antenna round; antennal imbrications minutely denticulate. Cornicle mere ring. Fore wing with media usually twice-branched; hind wing with veins rather faint. Rostral IV+V very broad .05 long by .06 at base, barely surpassing 1st coxa.

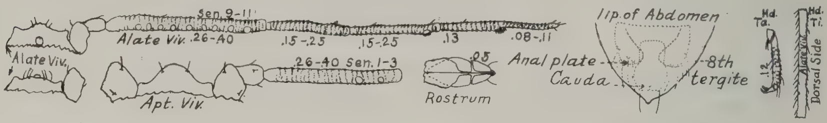

Fig. 89. *Thripsaphis producta*

Collections. On leaves of *Carex nebraskensis.* Colorado: Fort Collins. Utah: Salt Lake City. Apterous summer viviparae June 20 to Oct. 16, alate viviparae June 3 to 20; common.

Type. U.S.N.M., No. 41948. Paratypes, Colo. Agr. Exp. Sta. Collection.

This species differs from *T. ballii* as follows: Darker body (especially in the aptera), presence of secondary sensoria on antenna of aptera, greater number of sensoria (more than 7) on III of alata, more produced vertex in aptera, and usually more U-shaped cleft in anal plate.

Thripsaphis utahensis Knowlton and Hall

Thripsaphis utahensis Knowlton and Hall, 1950:41.

Apterous Summer Vivipara. (Mounted on slide), pale except as follows: Antenna, especially beyond base of III dusky, legs slightly dusky. Dorsum sparsely denticulate to papulate. Vertex with wartlike projection rising gradually. Tergite VIII rounded. Body length 1.3; across eyes .41-.44; antenna 1.12; hind tibia .56; hind tarsal II .15; rostrum attaining between 1st and 2d coxae. Hairs inconspicuous. Cauda knobbed.

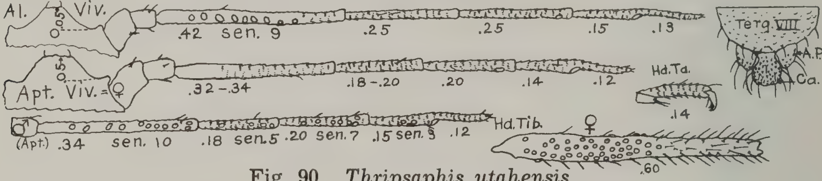

Fig. 90. *Thripsaphis utahensis*

Alate Vivipara. (Mounted on slide), pale except as follows: Head, thorax, dorsal bands and lateral areas on abdomen, antenna, cornicle and tarsi dark; legs, cauda and anal plate pale to dusky. Dorsal surface coarsely and sparsely denticulate. Body length 1.65; across eyes .40; antenna 1.33; hind tibia .65; rostral IV+V .06 long, surpassing 1st coxa. Vertex with median projection rising gradually.

Ovipara. Apterous. Markings same as apterous vivipara with the addition of slightly dusky lateral areas on abdomen. Body length 2.25; across eyes .45; hind tibia with proximal half somewhat swollen and covered with scattered sensoria.

Male. Apterous. Body length 1.45; across eyes .35; antenna 1.16; hind tibia .45. Otherwise as in vivipara.

Collections. On grass. Utah: Brigham and Logan. Apterous viviparae May 24 and Oct. 15, alate viviparae May 24, sexuales Oct. 15; rare.

Type. Knowlton Collection.

Chief Distinguishing Characters. Wartlike projection on vertex which arises gradually, not abruptly, absence of sensoria on III of aptera and length of unguis (.12).

Thripsaphis verrucosa Gillette

Brachycolus ballii Gillette, 1908b:67 (ovipara-misidentification).

Thripsaphis verrucosa Gillette, 1917c:194; Gillette and Palmer, 1931:911; Hottes and Frison, 1931a:271; Strom, 1942:334 (synonymy).

Thripsaphis caricicola Swain, 1918a:367.

Apterous Vivipara. Same as ovipara except hind tibia which is not swollen.

Alate Vivipara. With dark markings as follows: Head and thorax, broad dorsal bands somewhat broken and lateral areas (one surrounding cornicle) on abdomen; entire antenna black; most of legs dusky. Measurements about as in ovipara. Wartlike projection on vertex rising abruptly, .04 high, dorsal to ocellus. Wings hyaline; fore wing with twice-forked media; hind wing with both cross-veins distinct. Body length 2-2.4; antenna 1.6-1.8; hind tibia .75-.85; hind tarsal II .14-.15.

Ovipara. Pale greenish yellow with slight dusky transverse dashes on intersegmental lines; appendages blackish; with deep yellow spot just anterior to each cornicle and same size as cornicle pore and with wax threads projecting laterally from sides of abdominal VI and VII which threads are used to cover eggs. Body 2-3 by .96; vertex with wartlike projection rising abruptly, as long as antennal I. Antenna 1.60-1.80. Cornicle mere pore on middle of lateral portions of abdominal VI. Cauda knobbed; anal plate divided. Antenna with imbrications faintly denticulate. Hind tibia slightly swollen and bearing numerous small, slightly convex sensoria. Hairs throughout very short and inconspicuous, pointed. Body surface shagreened to finely denticulate.

Egg. At first, pale yellow, covered with waxy threads taken from body of female; later, black. Size .71 by .29. Laid length-wise on leaf near base.

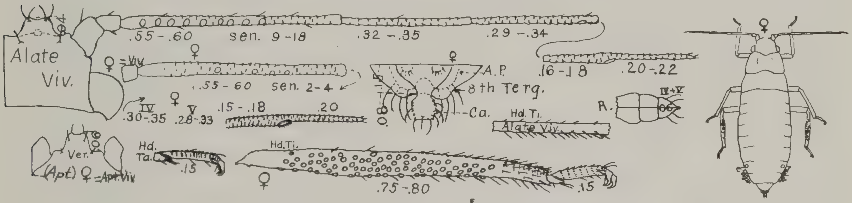

Fig. 91. *Thripsaphis verrucosa*

Collections. On leaves of *Carex nebraskensis.* Colorado: Fort Collins. Utah: Salt Lake City and Soldiers Summit. Apterous viviparae Sept. 16, oviparae Oct. 15 to Dec. 2; rare. Viviparae, both alate and apterous were taken in California near San Juan Capistrano, June 7, by R. C. Dickson.

Type. U.S.N.M., No. 41949.

Chief Distinguishing Characters. Conspicuous wartlike projection on the vertex of both alatae and apterae. The longer antenna also distinguishes it from *T. producta* and *T. balli.*

Subtribe **Drepanosiphina** Baker

Baker, 1920a:31.

Characters. Frontal tubercles developed, somewhat exceeding vertex. Antenna much longer than body. Abdomen of ovipara with terminal segments elongated to form long ovipositor. Cauda, knobbed; anal plate indented. Cornicle much longer than broad. Fore wing with media twice-forked.

Key to Genera of Drepanosiphina

1. Cornicle swollen at base (p. 85) .... *Drepanaphis*
.... Cornicle not swollen at base (p. 88) .... *Drepanosiphum*

Genus **Drepanaphis** Del Guercio

Del Guercio, 1909b:49; Baker, 1920a;31; Smith, 1941:226.

Characters. Frontal tubercles distinct. Antenna bearing only minute hairs; secondary sensoria large, oval and ciliated. Conspicuous dorsal tubercles present. First femur much stouter and longer than 2d and 3d, 2d pair weakest. Cornicle more than twice as long as broad, swollen for proximal two-thirds. Cauda knobbed; anal plate indented in vivipara. Ovipara with abdominal VII and VIII greatly prolonged to form ovipositor. Fundatrix alate. Living on leaves of trees.

Genotype (monotypical), *Siphonophora acerifolii* Thomas.

Key to Species of Drepanaphis

1. Dorsal tubercles on abdominal I developed into fingerlike projections 2
.... Dorsal tubercles on abdominal I undeveloped 3
2. Dorsal tubercles on abdominal I, II and III not all same size (p. 86) .... *acerifoliae*
.... Dorsal tubercles on abdominal I, II and III all same size (p. 86) .... *granovskyi*
3. Dorsal tubercles on abdominal III .22-.30, long, united more than halfway (p. 87) .... *spicatum*
.... Dorsal tubercles on abdominal III .07-.12 long, united very shallowly, less than halfway (p. 87) .... *utahensis*

Genotype *Drepanaphis acerifolii* (Thomas)

The Maple Aphid

Siphonophora acerifolii Thomas, 1877:4.
Drepanaphis acerifolii, Baker, 1923:286; Hottes and Frison,, 1931a:246 (description of sexuales); Gillette and Palmer, 1931:912.

Alate Vivipara. Olive-green to pale sordid greenish or brownish; thoracic lobes brown; cornicle pale greenish to brown; appendages sordid to greenish. Fore wing with margin of stigma, base of radius and tips and borders of all veins except first anal dusky; however, borders may be faint or, in mounted specimens, even invisible. Body length 2.3-2.5; across eyes .50-.52; hind tibia 1.1-1.4; hind tarsal II .12-.15; antenna 3.5-3.75, secondary sensoria large, oval-transverse, with cilia, arranged in a single row; cornicle usually carried at right angle to body. Dorsum with a pair of long fingerlike tubercles on abdominal I and on III (slightly united at base), a pair of shorter ones on II and on IV. Hairs very inconspicuous on antenna, minute, about .01 long. Fore wing with veins bordered with smoky; stigma dusky, with pale center. Rostral IV+V .11, hardly attaining 2d coxa.

Ovipara. Apterous. Dusky green fading anteriorly and posteriorly to sordid pale greenish. Terminal abdominal segments drawn out into long ovipositor. Body length 2.5-2.7; hind tibia 1.15; antenna 3. Hairs capitate, .10-.15 long on body and vertex.

Male. Alate. Head and thorax pale sordid to medium brown; abdomen pale greenish with black dorsal patch on abdominal III, IV and V. Dorsal tubercles on abdominal I often poorly developed. Otherwise as in alate vivipara. Body length 1.5; hind tibia 1.15; antenna 3.5.

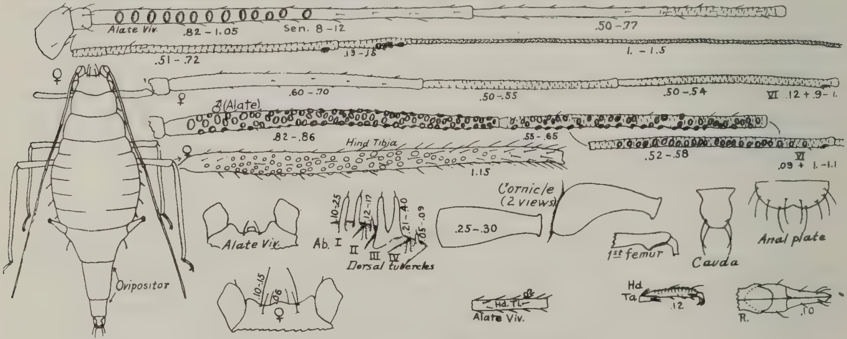

Fig. 92. *Drepanaphis acerifolii*

Collections. On leaves of *Acer saccharinum*, solitary. Colorado: Greeley, Boulder, Denver and Fort Collins. Utah: Bountiful, Logan, Provo and Salt Lake City. Fundatrices May 12 to June 1, alate viviparae May 26 to Oct. 2, oviparae Sept. 30 to Nov. 7, males Sept. 30 to Oct. 2; common.

Type. Ill. Nat. Hist. Surv. Collection, lectotype, No. 7168; paratype, No. 7169.

Drepanaphis granovskyi Smith and Knowlton

Drepanaphis granovskyi Smith and Knowlton, 1943:173.

Alate Vivipara. "Pale whitish yellow, occasionally with a greenish tinge on abdomen; thorax fuscous"; appendages pale with tarsi and tips of tibiae and of antenna dusky. Fore wings with veins slightly tipped with dusky and with dusky area near proximal end and near distal end. Abdomen with dorsal tubercles on I, II, III and IV. Body length 1.25-1.50-"1.60";

antenna 2.30; hind tibia ".82"-.95-1.06; rostrum attaining between 1st and 2d coxae. Cornicle vasiform. Cauda somewhat knobbed, bearing 2 pairs of lateral hairs.

Collections. On leaves of *Acer grandidentatum.* Utah: Throughout state, especially northern part. Idaho: Mink Creek and Strawberry Creek. Alate vivipara June 17 to Oct. 4; rather common.

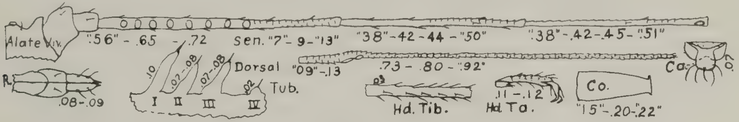

Fig. 93. *Drepanaphis granovskyi*

Holotype. U.S.N.M. Paratypes, Knowlton, Smith, Utah. Agr. Exp. Sta. and Granovsky Collections.

Chief Distinguishing Characters. Number and size of dorsal tubercles (as illustrated), uniformly pale body and appendages, fuscous markings of fore wing (confined to veins), small size of body (less than 2) and antenna (shorter than 2.5).

Drepanaphis spicata Smith

Drepanaphis spicatum Smith, 1941:241; Smith and Knowlton, 1943:174.

Alate Vivipara. (Mounted on slides), head and thorax brownish; abdomen pale with brown lateral areas and dorsal tubercles and often with dark areas at bases of hairs; antennal I and II, tips of III, IV and V and entire VI, especially about sensoria, and entire cornicle brownish; cauda, anal plate, tibiae and rostrum pale; femora may be pale or more or less brownish, especially distally. Fore wing with veins tipped and peripheral portion of stigma brown. Body length 1.60-1.90; across eyes .48-.51; antenna about 4.50; hind tibia 1.25-1.50; rostral IV+V .10 attaining between 1st and 2d coxae. Dorsal tubercles minute on abdominal I, II and IV, .22-.30 long on III and joined about halfway.

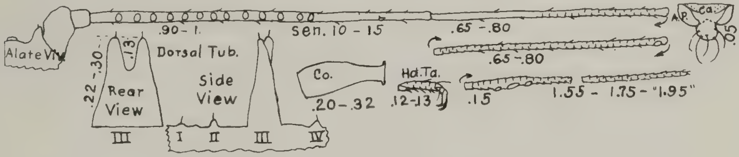

Fig. 94. *Drepanaphis spicata*

Collections. On leaves of *Acer grandidentatum.* Utah: Numerous localities, especially in the northern part of the state. Idaho: Franklin and Mink Creek. Alate viviparae in July; not rare.

Type. U.S.N.M. Paratypes, Smith and Utah Agr. Exp. Sta. Collections.

These specimens differ somewhat from the typic material from Carolina on *Acer spicatum* in that the dorsal tubercles on abdominal III are larger in some cases and dark areas at bases of hairs are usually less evident.

Chief Distinguishing Characters. Large partially united dorsal tubercles (.22 - .30 long) on abdominal III and rather strongly bent, usually dark, cornicle.

Drepanaphis utahensis Knowlton and Smith

Drepanaphis utahensis Knowlton and Smith, 1943:174.

Alate Vivipara. "Thorax relatively dark, general color whitish owing to powdery secretion"; appendages pale with antennal I, II and VI and tips of III and IV, tarsi, tips of tibiae, sometimes entire cornicle, dorsal tubercles, and lateral areas on abdomen dark; fore wing with tips of veins, base of radius and border of stigma, especially proximally and distally, fuscous; hind wing with area at base of hamuli also fuscous. Abdomen with dorsal tubercles on I, II, III and IV, conspicuous only on segment III where they are joined at base. Body length 1.50-1.80-"2"; across eyes ".45"-.51-.53-".56"; antenna about 4; hind tibia 1.10-1.25-"1.74";

rostrum attaining between 1st and 2d coxae. Cornicle slightly vasiform. Cauda knobbed, bearing 2 pairs of lateral hairs and a single preapical one. Hairs pointed and inconspicuous; on hind tibia .03, on body .04.

Collections. On leaves of *Acer grandidentatum.* Utah: Numerous localities, especially in the northern part of state. Idaho: Boise, Franklin and Mink Creek. Alate viviparae May 11 to Oct. 5; not rare.

Holotype. U.S.N.M. Paratypes, Knowlton, Smith and Utah Agr. Exp. Sta. Collections.

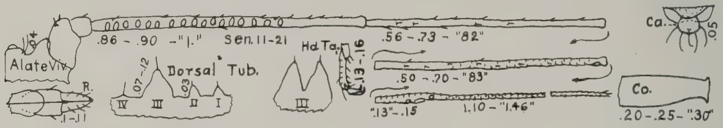

Fig. 95. *Drepanaphis utahensis*

Chief Distinguishing Characters. Relative sizes and color of the dorsal tubercles, predominantly the pair on abdominal III (dark, stout and joined at the base), pale general colors of body with fuscous thorax and dark lateral areas on abdomen and dark antennal I, II and VI, large size of body (1.5 - 2) and antenna (about 4) and only slightly swollen cornicle.

This species is very close to *Drepanaphis spicata* Smith and apparently differs only in somewhat smaller size and usually shorter dorsal tubercles, antennal and cornicle measurements. However, as the limits of variation of these parts overlap no certain line of separation can be drawn.

Genus **Drepanosiphum** Koch

Koch, 1855:201; Baker, 1920a:32.

Characters. Frontal tubercles distinct. Antenna longer than the body, with minute hairs; unguis many times longer than base of VI; secondary sensoria large, oval and ciliated. Cornicle more than five times as long as wide, slightly swollen, smooth. Cauda knobbed; anal place indented in vivipara. Ovipara with terminal abdominal segments elongated to form ovipositor. Living on foliage.

Genotype (fixed by Lichtenstein, 1885:175) *Aphis platanoides* Schrank.

Key to Species of Drepanosiphum

1. Cornicle swollen slightly on distal half; sensoria on II of alata about 20 (p. 89) .... *platanoides*

.... Cornicle not swollen; sensoria on III of alata fewer than 15 (p. 88) .... *braggii*

Drepanosiphum braggii Gillette

Drepanosiphum braggii Gillette, 1907; 393; Gillette and Palmer, 1931:914.

Fundatrix. Alate. Similar to summer vivipara.

Alate Summer Vivipara. Pale yellow to greenish with tinge of brown on head and pronotum and yellow-brown on meso- and metanotum; ocelli surrounded with brown; appendages pale to brownish at tip of segments; cornicle pale at base, brownish to blackish at tip; wings hyaline, stigma pale, bordered with brown. Body length 3; hind tibia 2.80; hind tarsal II .15-.19; antenna 4.3-6.3, secondary sensoria oval-transverse and ciliated. Cornicle cylindrical, somewhat constricted before flange and gently curved outwards. Rostral IV+V .15, barely attaining 3d coxa. Hairs slightly capitate and short.

Ovipara. Apterous. Dusky olive-green fading anteriorly and posteriorly to pale sordid greenish; cornicle pale brown; appendages colorless with tips of tarsi and of antennal segments blackish. Body length 3.8; antenna 5.55; hind tibia 2.22. Terminal abdominal segments prolonged to form distinct ovipositor. Hind tibia hardly swollen but bearing numerous sensoria on proximal half.

Male. Alate. Similar to vivipara except 2-4 short black bands on abdominal III, IV, V and VI. Body length 2; antenna 5.2.

Collections. On leaves of *Acer negundo.* Colorado: Fort Collins. Utah: Numerous localities in northern part of the state. Idaho: Fish Haven. Fundatrices May 15 to June 4, alate summer viviparae June 20 to Oct. 2, apterous oviparae Sept. 5 to Nov. 2, males Sept. 3 to Oct. 3; quite common.

Type. U.S.N.M. Paratypes, Colo. Agr. Exp. Sta. Collection.

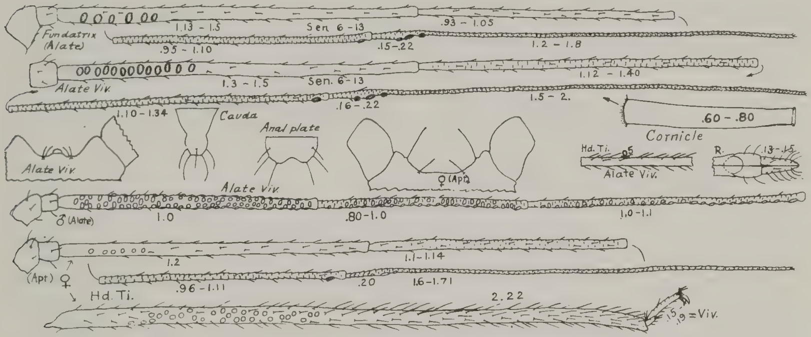

Fig. 96. *Drepanosiphum braggii*

Genotype *Drepanosiphum platanoides* (Schrank)

The Sycamore Aphid

Aphis platanoides Schrank, 1801:112.

Drepanosiphum platanoides, Buckton, 1876:183; Wilson, 1909b:349; Theobald, 1927: 382.

Alate Vivipara. Various shades of yellow or reddish to green with black markings and bands; legs and cornicle yellow to dusky orange; wings hyaline. Body length 2.7-3.5; hind tibia 2-2.25; hind tarsal II .18-.20; antenna 5, secondary sensoria large, oval to narrow-transverse, arranged in a single row; rostral IV+V .16 long, obtuse, hardly attaining 2d coxa. Hairs fine and pointed in adult; heavier on vertex .12 long and slightly capitate in nymph.

Ovipara. Alate. Same as vivipara except antenna and hind tibia, as figured, anal plate which is not indented and tip of abdomen forming elongated ovipositor.

Male. Alate. Similar to alate vivipara except antenna, as figured.

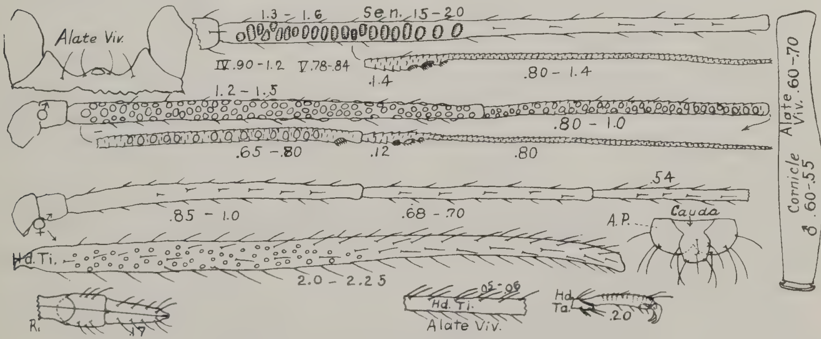

Fig. 97. *Drepanosiphum platanoides*

Collections. On leaves of *Acer platanoides, A. campestris* and *A. pseudoplatanus.* Utah: Logan. Alate viviparae June 4 and Sept. 19, oviparae Nov. 14; apparently rare.

Subtribe **Chaitophorina** Baker

Baker, 1920a:33.

Characters. Frontal tubercles lacking. Body, legs and usually antenna with numerous long hairs; hairs simple, spinelike. Cornicle truncate, length never greatly exceeding diameter at base, reticulated on distal portion (except *Hoplochaitophorus).* Anal plate rounded or indented, never divided. Cauda rounded or knobbed, never elongate. Fore wing with radial sector distinct, media twice-forked. Living in colonies; sluggish in movement.

Key to Genera of Chaitophorina

1.	Cauda knobbed	2
....	Cauda semilunar, broader than long (p. 94)	*Periphyllus*
2.	Antenna five-segmented (p. 103)	*Sipha*
....	Antenna six-segmented	3
3.	Cornicle reticulated; anal plate rounded or merely emarginate (p. 90)	*Chaitophorus*
....	Cornicle not reticulated; anal plate indented (p. 93)	*Hoplochaitophorus*

Genus **Chaitophorus** Koch*

Koch, 1854:1; Baker, 1920a:33.

Characters. Frontal tubercles absent. Antenna six-segmented, with circular or oval sensoria and bearing prominent hairs, unguis twice or more times as long as base of VI. Hairs simple, usually spinelike, numerous on body. Cornicle truncate, hardly longer than broad, reticulate distally and imbricated proximally. Cauda knobbed; anal plate rounded or indented. Fore wing with media twice-branched. Male either apterous or alate. Ovipara apterous.

Genotype (fixed by Gerstaecker, 1856:202), *Aphis populi* Linn.*

Key to Species of Chaitophorus

1.	Sensoria on III in alata, arranged in a single row, not more than 10 in number	2
....	Sensoria on III in alata arranged in irregular double row, 9 or more (usually 12) in number	3
2.	IV hardly ever exceeding .15 in length; sensoria on III in alata 8-10, never with green circle on dorsum. On *Salix* (p. 92)	*viminalis*
....	IV exceeding .15 in length; sensoria 2-7 on III in alata; with green circle on dorsum. On *Populus* (p. 90)	*populellus*
3.	Sensoria absent on IV of alata (p. 91)	*populi*
....	Sensoria usually present on IV of alata (p. 92)	*populifoliae*

Chaitophorus populellus Gillette and Palmer

The Clear-winged Cottonwood Leaf Aphid (Plate III, 10-12)

Chaitophorus populella Gillette and Palmer, 1928:15 and 1931:917.

Fundatrix. Body length 2; hind tibia .50-.60; antenna .72-.90, III .25-.31, IV .13-.17, V .11, VI .08+.17-.20.

Apterous Summer Vivipara. Light green to yellowish with darker green circle on dorsum of abdomen connected by lines to lateral margins of abdominal I, IV and VII; legs pale, tarsi black. Body length 1.5-2; hind tibia .50-.70; hind tarsal II .12; antenna .95-1.4. Hairs on body stout and pointed, .08-.10 long, fairly numerous; on antenna finer, .04 long; on hind tibia .06 long moderately numerous and erect. Rostral IV+V .12 long and attaining about 2d coxa.

Alate Vivipara. Same in color and measurements as apterous vivipara except faint, dusky bands on abdomen, green markings coalescing on sides leaving pale yellow circle on dorsum of abdominal II, III and IV and around cornicle bases; wings hyaline.

Ovipara. Apterous. Measurements same as apterous vivipara. Hind tibia moderately swollen and covered with scattered sensoria.

Apterous Male. Head and thorax black; abdomen dark green with blackish dashes and lateral areas on each segment. Body length 1.2; hind tibia .50-.60; antennal 1.1-1.4.

Alate Male. Body length 1.5-2.0; other characters as in apterous male.

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*The status of this generic name is in question, pending an opinion by the International Commission of Nomenclature to whom a petition has been submitted asking that *Chaitophorus* be made nomen conservanda and requesting the setting of a more suitable genotype. The present genotype *Aphis populi* Linnaeus varies from Koch's concept of the genus, since Linnaeus described it "*cornicula nulla.*" Linnaeus' description agrees with *Asiphum tremulae* DeGeer and would bring about the replacement of *Asiphum* by *Chaitophorus*, placing the latter name in a concept totally disagreeing with Koch's clear description of the genus.

Collections. On leaves of *Populus sargenti*, *P. angustifolia* and *P. sp.* Colorado: Fort Collins, Aspen, Eckert, and Steamboat Springs. Utah: Morgan, Tooele and Pinecrest. Fundatrices March 30 and April 2, apterous viviparae April 20 to July 23, alate viviparae April 20 to July 20, sexuales Oct. 10 to 23; fairly common.

Type. U.S.N.M., No. 41972. Paratypes, Colo. Agr. Exp. Sta. Collection.

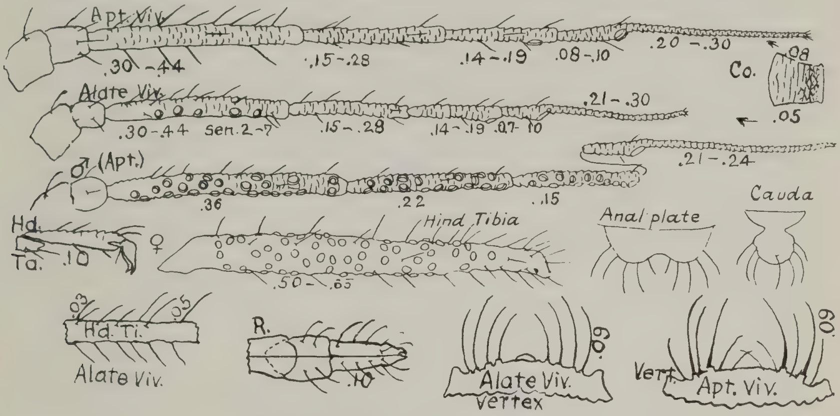
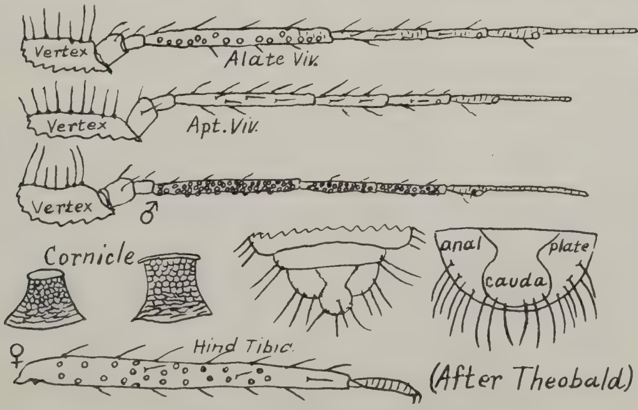


Fig. 98. *Chaitophorus populellus*

Chief Distinguishing Character. Length of III (longer than unguis), length of V (1.5 - 2 times base of VI, length of unguis (2 - 3 times base of VI), number of secondary sensoria on III (fewer than 9) and their arrangement in a single row, absence of sensoria on IV and absence of distinct dark bands on the abdomen of the alate vivipara.

[Genotype *Chaitophorus populi* (Linnaeus)]

Aphis populi Linnaeus, 1758:453.
Aphis populeti Panzer, 1801:6.
Chaitophorus populi, Koch, 1854:12; Buckton, 1877:140; Theobald, 1929:10.



(After Theobald)

Fig. 99. *Chaitophorus populi*

As described by the last four authors this species possesses the essential characters ascribed to this genus, as shown in accompanying figure. Several apecies seem to be confused under this name.

Habbitat. On leaves of *Populus* sp. and *Salix* sp. Not recorded from region.)

Chaitophorus populifoliae Davis

The Clear-winged Aspen Aphid

Chaitophorus populifoliae (Fitch) (misidentification), Oestlund, 1887:38.
Chaitophorus populifoliae Oestlund, Davis, 1910d:489; Gillette and Palmer, 1931:918.

Alate Vivipara. Head and thorax black; abdomen pale green, with blackish bands; wings hyaline. Body length 2-2.20; hind tibia .60-.70; antenna about 1.25-1.5, sensoria circular, irregularly arranged on III; cornicle .09 long. Hairs on antenna rather short, .03-.05 long; on hind tibia .05-.06, slightly longer than diameter of tibia; on vertex .05-.09; on body .05-.07; cauda knobbed, anal plate sinuate. Rostral IV+V .09-.10, attaining 2d coxa.

Apterous Summer Vivipara. Same as alate vivipara except body color mottled with dark green and unguis generally shorter than III, but sometimes equal.* Hairs spinelike; on body .03-.09; on hind tibia semierect, .05-.09 (diameter of tibia .04).

Ovipara. Apterous. Body length 1.8-2.0; otherwise as in apterous vivipara except hind tibia which is .58 long and moderately swollen and bearing numerous sensoria along almost entire length.

Male. Apterous. Body length 1.2-1.4; otherwise as in alate vivipara except that antenna bears numerous small sensoria on III, IV and V.

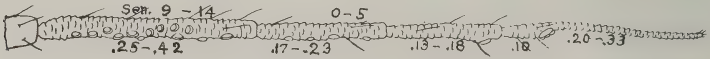


Fig. 100. *Chaitophorus populifoliae*

Collections. On leaves and twigs of *Populus tremuloides* and *P. acuminata* and *Quercus gunnisoni*. Colorado: Throughout the state. Utah: Mount Timpanogos and Mount Carmel. Apterous summer viviparae June 13 to Oct. 2, alate viviparae June 22 to Sept. 25, sexuales Oct. 2; rather common.

Cotypes. Univ. of Minn. Collection.

Chief Distinguishing Characters. Number of secondary sensoria (9 - 17) and their irregular arrangement on III of the alate vivipara, dark dorsal bands on the abdomen of the alate vivipara only and the absence of the green circle on abdomen of both alate and apterous forms, and short rostral IV+V (.09-.10). The latter character distinguishes this species from *C. populeti* Panzer and *C. populi-albae* Boyer de Fonscolombe as determined by Hille Ris Lambers.

Chaitophorus viminalis Monell

The Little Black and Green Willow Leaf Aphid

Chaitophorus viminalis Monell, 1879:31, Hottes and Frison, 1931a:165; Gillette and Palmer, 1931:919.
Chaitophorus nigrae Oestlund, 1887:40.

Fundatrix. Light yellowish green, darker on head and thorax and lighter posteriorly; antenna, rostrum and legs pale with tips blackish. Body and appendages hairy. Body length 1.86; antenna six-segmented, 1.14, III .17, IV .08, V .07, VI .07+.07; hind tibia .50.

Apterous Summer Vivipara. Light green, brown, yellow or colorless with 4 green spots, often with a pair of green longitudinal stripes or broad black vittae extending to sides of body, cornicle pale surrounded by pale area; legs pale with tips of tarsi black. Body length 1.5-2; surface somewhat denticulate; antenna .90-1.2; rostrum attaining between 2d and 3d coxae. Hairs simple, on body some spinelike .05-.08 long, others fine .03 long; on vertex .08-.10, spinelike; on antenna rather fine, spinelike, .06 long; on hind tibia fine, erect, .08 (diameter of tibia .04).

Alate Vivipara. Head and thorax black; abdomen green with black lateral areas and bands on all abdominal segments; head and thorax black; wings hyaline. Measurements same

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*Two collections were taken Aug. 12 and 20 at Pingree Park and Black Mesa, Colo., in which the specimens had unguis never shorter, usually longer than III and sensoria 6-10 in a row on III in alate vivipara. These resemble *Chaitophorus essigi* Gillette and Palmer excepting in the dark bands of the alate vivipara.

as in aptera or somewhat longer. Hairs simple, rather numerous; .05-.08 and erect on hind tibia; .04-.05 on antenna; .08 on vertex and .05 on body.

Ovipara. Apterous. Dingy carneous brown, lighter along median region; some examples lighter and greenish; head, prothorax, tip of abdomen and most of appendages brownish. Measurements as in apterous vivipara. Hind tibia much swollen and bearing scattered sensoria along almost entire length.

Male. Alate. Head and thorax black; abdomen light greenish yellow with broad black bands and lateral areas on all segments; distal portions of appendages dusky. Body length 1.26, antenna 1.

Egg. First, colorless to yellowish; later, shining black. Size .60 by .33.

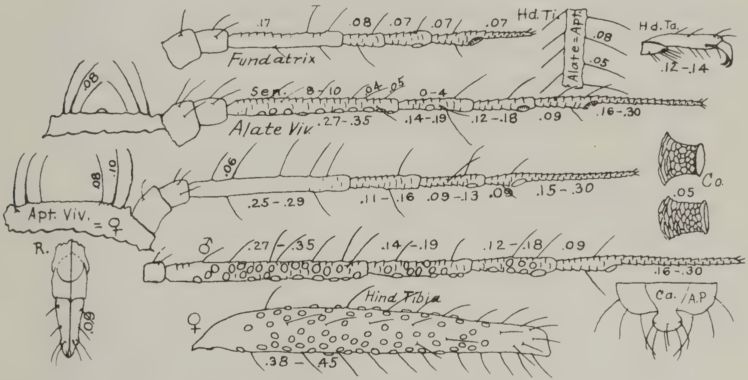

Fig. 101. *Chaitophorus viminalis*

Collections. On leaves of *Salix* sp. Throughout region. Fundatrix April 28, apterous summer viviparae May 21 to Oct. 20, alate viviparae May 29 to Oct. 20, oviparae Oct. 2 to Nov. 7, males Oct. 2 to 22; very common; in large colonies.

Cotypes. Davis Collection.

Chief Distinguishing Characters. Sensoria on III not more than 10 and in single row in alate vivipara and color patterns (the pale forms with four green spots or with green vittae and the dark brown to blackish forms with pale yellow median stripe occurring mingled together in the colonies). The pale and dark forms were formerly considered distinct species, but no corresponding structural differences to justify separation could, at present, be established. See Hottes and Frison (op. cit.).

Genus **Hoplochaitophorus** Granovsky

Granovsky, 1933:29.

Characters. Vertex convex; frontal tubercles only slightly produced. Ocular tubercle present. Antenna six-segmented; secondary sensoria subcircular with narrow rims. Cornicle truncate, narrowed in distal portion, with flaring flange, surface smooth. Cauda knobbed; anal plate distinctly bilobed. Hairs on body of aptera set on tubercles and developed into heavy spines, interspersed with sparse fine hairs; on appendages fine and inconspicuous; in alata fine and inconspicuous on both body and appendages. Fore wing with media twice-branched, radial sector distinct and curved; all veins, including costa and subcosta rather broadly bordered with fuscous bands. Ovipara with long drawn out ovipositor. Male apterous. Living in crowded colonies on upper surfaces of leaves.

Chief Distinguishing Characters. Heavy spines on the body of aptera and shape of cornicle.

Genotype (monotypical), *Chaitophorus quercicola* (Monell).

Genotype *Hoplochaitophorus quercicola* (Monell)

Chaitophorus quercicola Monell (Jan.) 1879:32.
Callipterus quercifolii Thomas, 1879:112.
Chaitophorus spinosus Oestlund, 1886:49.
Chaitophorus quercicola, Davis, 1910d:415 and 1913:99 and 105 (synonymy); Oestlund, 1922:124.
Hoplochaitophorus quercicola, Granovsky:1933:32.

*Apterous Summer Vivipara.** Cornicle yellow or slightly dusky; legs mostly yellow with knees dusky and hind tibia dusky on proximal half, tips hardly dusky; tarsi dark; antenna annulated. Body length 1.8-2; across eyes .40; hind tibia 1.20; hind tarsal II .13. Hairs on body including vertex, numerous, consisting of heavy black spines and sparse, shorter, fine hairs set on tubercles; on appendages fine and rather inconspicuous.

Alate Vivipara. Color same as in apterous vivipara and with antenna annulated, I, II and VI entirely black. Body length 1.5; across eyes .48; antenna 1.4; hind tibia 1.2-1.4; hind tarsal II .13; rostrum barely attaining 2d coxa. Hairs on body, including vertex, fine and moderately long and sparse.

Alatiform Aptera. Same as alate vivipara in size and antennal characters; same as apterous vivipara in hairs and spines of the body.

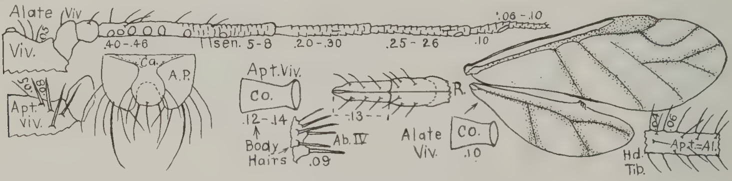

Fig. 102. *Hoplochaitophorus quercicola*

Collections. On leaves of *Quercus* sp. Colorado: Fort Collins.

Only one species represented in region.

Alate viviparae, apterous viviparae and alatiform apterae June 6; rare.

Cotypes. Davis Collection.

This species is distinctly outstanding for the same characters as the genus.

Genus **Periphyllus** van der Hoeven

Hoeven, van der, 1863:7; Baker, 1920a:34.

Characters. Frontal tubercles absent. Ocular tubercle present. Antenna six-segmented (except in dimorph); with circular to oval sensoria; unguis not shorter than base of VI. Body and usually antenna with prominent spinelike hairs. Cornicle short, truncate, usually imbricate or reticulate. Cauda and anal plate rounded. Fore wing with media twice-branched. Male alate or apterous. Ovipara and fundatrix apterous.

Genotype (monotypical), *Periphyllus testudo* van der Hoeven** (syn. of *Phyllophora testudinacea* Fernie).

Key to Species of *Periphyllus*

1. Unguis not distinctly longer than base of VI 2
.... Unguis longer than base of VI 3
2. Color of body never blackish; wings not smoky; veins not bordered. On bark near roots (p. 100) .... *salicicorticis*
.... Color of body dark brown to blackish; wings smoky; veins bordered. On bark of twigs (p. 98) .... *macrostachyae*
3. Hairs on vertex not longer than .10 4
.... Hairs on vertex longer than .10, at least in aptera 6

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*Antennae missing on all specimens at hand.

***Phillophorus testudinatus* Thornton, of which *testudo* van der Hoeven has been given as a synonym by authors, was apparently never published.

4. Rostral IV+V (.17-.20), longer than unguis (p. 102)........*utahensis*
.... Rostral IV+V (.12-.14), not longer than unguis........ 5
5. Unguis 1-1.5 times base of VI; wings hyaline (p. 96)........*brevispinosus*
.... Unguis at least twice as long as base of VI; wings hyaline (p. 101)........*saliciniger*
.... Unguis hardly twice as long as base of VI; wings with veins heavily bordered........ 8
6. Unguis about 3 times as long as base of VI (p. 102)........*testudo*
.... Unguis shorter than 3 times base of VI........ 7
.... Unguis at least 4 times base of VI (p. 97)........*lyropictus*
7. Unguis hardly longer than twice base of VI (p. 98)........*negundinis*
.... Unguis 2-3 times length of base of VI (p. 95)........*americanus*
.... Unguis shorter than 2 times length of base of VI (p. 96)........*brevispinosus*
8. Body dark brown to black (p. 97)........*bruneri*
.... Body green and brown (p. 99)........*populicolus*

Periphyllus americanus (Baker)

The American Maple Aphid

Chaitophorus americanus Baker, 1917a:428 and 1918:86.
Periphyllus palmerae Knowlton, 1947b:24.

Apterous Summer Vivipara. "Pale yellowish green with dark median stripe on abdomen forming a cross in the region of the cornicles."* (Cleared and mounted on slide), pale throughout except tarsi and tips of III, IV and V and entire VI which are dark. Body length about 2; hind tibia .80-1.1; hind tarsal II .16; antenna 1.64-1.85; rostrum attaining 2d coxa. Hairs spinelike on body, .13-.20 long. Cornicle with broadened base, approximately cylindrical and reticulated on distal half.

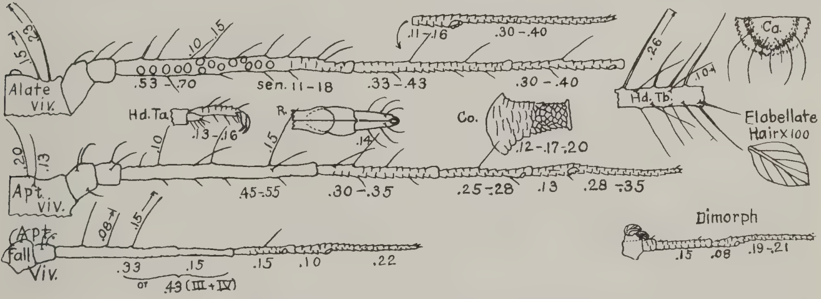

Fig. 103. *Periphyllus americanus*

Alate Vivipara. (Cleared and mounted in balsam), head, thorax, antenna, cornicle and legs beyond proximal portion of femora blackish; abdomen pale with dark lateral areas and dorsal bands, the latter frequently broken on median line. Body length 1.4-2; across eyes .49-.55; hind tibia 1.2-1.4; antenna 1.4-2.14; rostrum attaining 1st-2d coxa. Hairs on body spinelike, curved, .10-.15 long.

Dimorph. "Pale green"; without dark markings. Body length .45-.50; across eyes .19-.20; antenna .45-.50; hind tibia .13-.14; hind tarsal II .06. Body flat and armed with flabella in place of simple hairs, situated as follows: 2 on vertex, 2 on antennal I, one (much narrowed and reduced) on lateral margin of prothorax (near posterior suture), one somewhat narrowed on mesothorax, one (.06 by .04) on lateral margin of each subsequent body segment, totaling 11 on each side; with a pair of shaftlike or greatly narrowed flabellate hairs .06 long on tip of abdomen. Antennal I with double protuberance on anterior margin forming bases of hairs. First and second tibiae bearing flabellate hairs on outer margin, hind tibia with simple hairs. Cornicle not evident. Dorsal plates visible only as a pair on median line on meso- and metathorax and abdominal I and II, rather dim.

Apterous Fall Vivipara. (Perhaps dimolt). (Mounted in balsam), without dark markings. Body length 1.70-2; across eyes .45-.50; hind tibia .65-.80; hind tarsal II .12; antenna about 1.0, III .33 (imperfectly divided), IV .15 (III+IV fused .43), V .15, VI .10+.22; rostral IV+V .12, attaining 2d coxa. Hairs as in apterous summer vivipara.

Collections. On *Acer grandidentatum, A. saccharum, A. saccharinum, A. pseudoplatanus* and *A. glabrum,* on leaves. Colorado: Grand Junction. Utah:

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*According to Hottes in correspondence.

Centerville, Logan, Salt Lake City, Settlement Canyon, Blacksmith Canyon, Provo Canyon, Springville, Mountain Home and City Creek Canyon. Apterous summer viviparae May 20 to Sept. 28, apterous fall viviparae Sept. 19, alate viviparae May 6 to Sept. 29, dimorphs May 10 to Sept. 2; fairly common where host occurs.

Cotypes. U.S.N.M.

Statement in original description giving cornicle as .24 is apparently a typographical error as cornicle on cotypes measure no more than .15.

Chief Distinguishing Characters. Length of unguis in adult (.30-.40, about the same as IV, in dimorph .18-.20), dorsal plates of dimorph which comprise only two median rows ending on abdominal III, length of antennal III (.52-.70) and length of hairs on antennal III (.10-.17).

Periphyllus brevispinosus Gillette and Palmer

The Colorado Maple Aphid

Periphyllus brevispinosus Gillette and Palmer, 1930:546 and 1931:921.

Fundatrix. Body length 2.4-2.50 by 1.50; hind tibia .75; hind tarsal II .15; antenna 1, III .33, IV .15, V .15, VI .12+.08-.10. Other characters as in summer forms.

Apterous Summer Vivipara. Brown, with dark and light mottling; cornicle yellow; appendages mostly yellow. Body length 2.40; hind tibia .85; antenna 1.30; rostrum moderately broad attaining about to 3d coxa. Hairs as in alate vivipara.

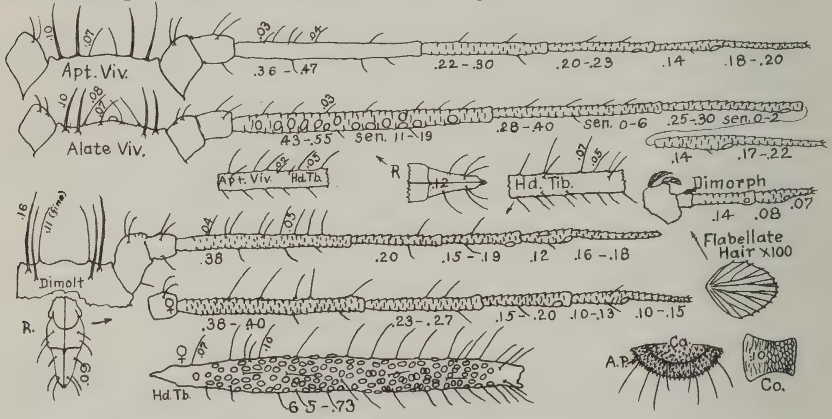

Fig. 104. *Periphyllus brevispinosus*

Alate Vivipara. Head and thorax black; abdomen dark brown with dark dorsal bands and lateral spots; cornicle blackish; appendages slightly dusky; wings hyaline. Body length 2.25; hind tibia 1; antenna 1.55; cornicle .11; cauda .14. Hairs on body and vertex, two kinds, some heavy, spinelike, .10-.13 long and others fine, .05; on antenna fine; on hind tibia fine to moderately spinelike. Rostrum barely attaining 2d coxa. Fore wing with media twice-branched.

Dimorph. Body length .60; across eyes .23; dorsum without mosaic pattern; antenna .35. Flabellate hairs usually with veins slightly protruding beyond margin of flabellum.

Dimolt (Adult developed from dimorph). (Mounted on slide), body immaculate; appendages pale, darker distally. Body length about 2; across eyes .41-.45; antenna 1.20; hind tibia .63-.70; hind tarsal II .14; rostral IV+V .10. Hairs on body of two kinds, heavy, spinelike ones .20 long and fine ones .07-.13.

Ovipara. Apterous. Body length 2.15-2.30; across eyes .43-.45; antenna 1.15-1.25; hind tibia .65-.75; hind tarsal II .14-.15; rostral IV+V .09, attaining 2d coxa. Hind tibia considerably swollen along nearly entire length and bearing numerous sensoria.

Collections. On leaves of *Acer glabrum.* Colorado: Skyway, Eldora and Idaho Springs. Utah: Logan Canyon. Fundatrices June 3, alate and apterous viviparae June 17, dimolts Sept. 23, oviparae Sept. 27; rare, but usually abundant where found.

Type. U.S.N.M., No. 42816. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Short hairs on hind tibia and antenna (length of the longest hardly exceeding diameter of segment bearing them) and comparatively short rostral IV+V (.12-.13, shorter than base of VI).

This species agrees with *Symydobius* Mordvilko in the short ~~hairs~~ but with *Periphyllus* in the cornicle and anal plate.

Periphyllus bruneri (Williams)

The Black Cloudy-winged Poplar Leaf Aphid

Chaitophorus bruneri Williams, 1910:25; Davis, 1911b:6.
Periphyllus bruneri var. of *populicola*, Gillette and Palmer, 1931:925.

Apterous Summer Vivipara. Polished dark brown or black with segment lines pale and little or no trace of the pale V or Y pattern; legs black throughout.

Alate Vivipara. Head and thorax dark brown or black; abdomen yellowish to brown, with dark bands; cornicle pale. Fore wing with veins conspicuously bordered with blackish. Hind wing with media and cubitus faintly bordered. Measurements and structural characters same as in *P. populicola*. *Nymph.* Rusty-brown and showing the Y pattern.

Collections. On leaves and twigs of *Populus tremuloides* and *P. angustifolia,* rarely on *P. tacamahaca*. Throughout region. Apterous viviparae April 25 to Sept. 8, alate viviparae June 21 to Aug. 25; common.

Cotypes. Univ. of Nebraska, No. 25 and U.S.N.M., No. 38.

Same as typical *P. populicola* excepting that the coloring is much darker.

Periphyllus lyropictus (Kessler)

The Norway Maple Aphid

Chaitophorus lyropictus Kessler, 1886:171.
Chaïtophorus aceris Linnaeus (misidentification), Gillette, 1909c:387; Davis, 1910d:414.
Periphyllus lyropictus, Hottes and Frison, 1931a:170; Hille Ris Lambers, 1947:228.

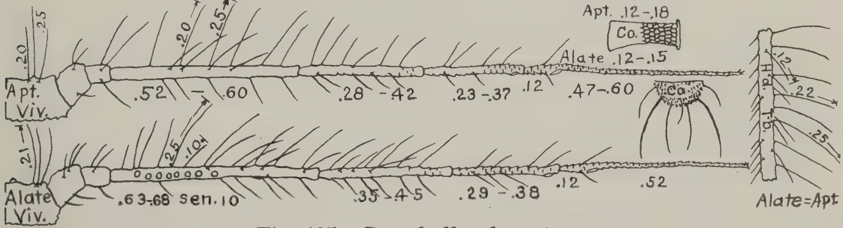

Fig. 105. *Periphyllus lyropictus*

Apterous Summer Vivipara. (Mounted in balsam), body pale; cornicle, tarsi, tips of tibiae and of antennal IV and V and entire VI dark. Body length 2.70; hind tibia .95-1.20; hind tarsal II .15; antenna 2.23; rostral IV+V .12, attaining 2d coxa. Hairs spinelike on vertex; on body of two kinds, some fine and .10 long and others heavy, spinelike, .20-.28 long. Cauda semilunar; cornicle nearly cylindrical and reticulated on distal half.

Alate Vivipara. Same as apterous vivipara except as shown in figure. Wings hyaline.

Ovipara. Apterous. (Mounted in balsam), body pale: tarsi, tips of tibiae and of antennal IV and V and entire VI dark. Body length 2.3-2.8; antenna about 2.13, III .60-.66, IV .35-.39, V .30-.31, VI .11+.50-.55; cornicle .18; hind tibia 1-1.15 long, moderately swollen for nearly entire length and bearing numerous tuberculate sensoria; otherwise as in apterous vivipara.

Male. Alate. Same as alate vivipara except as follows: Length of body 1.7 and presence of numerous sensoria on III, IV and V.

Collections. On *Acer platanoides* and *A. saccharum.* Utah: Logan. Alate viviparae June 4 and Sept. 18, apterous viviparae June 4 to Oct. 12, sexuales Sept. 24 to Oct. 23; rare.

Chief Distinguishing Characters. Length of unguis (4-5.5 times base of VI), long hairs (about .20 long on hind tibia) and number of sensoria on III of alate vivipara (about 10).

Periphyllus macrostachyae (Essig)

Symydobius macrostachyae Essig, 1912a:727.
Periphyllus macrostachyae, Gillette and Palmer, 1931:922.

Apterous Summer Vivipara. Reddish brown to blackish; with lighter area about cornicles and often paler Y or V marking on dorsum of abdomen; legs pale brownish with knees, tips of tibiae and tarsi dusky to blackish; cornicle yellow. Body 1.5-2 by .8-1.0; hind tibia .7-.8; hind tarsal II .12-.14; antenna .75-1.0. *Nymph.* Pale or reddish yellow marked by reddish brown as follows: Band on abdominal I, a pair of dorsolateral longitudinal lines from prothorax to abdominal IV, and ring enclosing pale area around each cornicle and connecting anteriorly with band on abdominal I, thus making pale Y or V pattern on dorsum, similar to *P. populicola.*

Alate Vivipara. Head and thorax dark; abdomen reddish brown with black bands; fore wing slightly smoky, veins narrowly bordered with brown, stigma short with depression at distal end and with light streak extending from subcosta. Posterior edge of stigma bearing scattered setulae. Body length 1.5-2.5 long; hind tibia 1.0; hind tarsal II .16; antenna 1.3. Hairs on body of two kinds, some heavy spinelike, .07-.10 long and rather sparse and others finer spinelike .04 long, numerous; on vertex .05-.08; on antenna fine; on hind tibia fine, .03-.04, erect. Rostral IV+V .18-.20 long attaining abdominal II or III.

Ovipara. Apterous. Body rather elongate, length 1.60-2; hind tibia moderately swollen and bearing scattered sensoria over most of length.

Male. Apterous. Body length .75-.90; hind tibia .50; hind tarsal II .10; antenna .65.

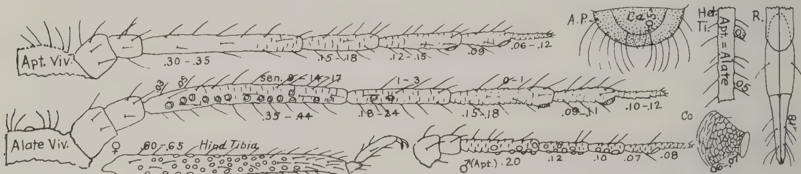

Fig. 106. *Periphyllus macrostachyae*

Collections. On bark of twigs of *Salix* sp. Colorado: Fort Collins, Bellvue, Boulder, Rocky Ford and Englewood. Utah: Bear River City and Currant Creek. Apterous viviparae May 2 to Aug. 21, alate viviparae May 9 to Aug. 21, oviparae Oct. 14 to 25, males Oct. 14; rather common.

Type. Essig Collection, No. 50.

This form differs from *P. macrostachyae* in the shorter rostrum which attains abdominal II (according to the original description "beyond tip of abdomen," but in two paratypes examined attaining middle of abdomen). However, as no other specific differences are apparent and the rostrum has been suspected of possible retractibility there seems to be insufficient basis for formation of a new species at this time.

Periphyllus negundinis (Thomas)

The Boxelder Aphid

Chaitophorus negundinis Thomas, 1877:10; Cockerell, 1904:263; Davis, 1908a:130 and 1910b:14; Webster, 1917:95; Baker, 1918:87.
Periphyllus negundinis, Gillette and Palmer, 1931:923.

Fundatrix. Rather dark apple-green; antenna pale to tip of V, remainder blackish; legs pale except tarsi and tips of tibiae. Body length 2.5-2.9; antenna .90-1.0, sometimes five-segmented; hind tibia .90. Otherwise as in apterous summer vivipara.

Apterous Summer Vivipara. Yellowish or sap-green to apple-green, with a pair of darker green vittae; legs pale to dusky; cornicle pale; antenna pale except tip. Body 2.0-2.5 by 1.0; hind tibia .70-1.1; hind tarsal II .15; antenna 1.0-1.5. Hairs heavy, spine-like and numerous, .15 long on vertex, .12 on body; slender and spinelike on appendages, on antennal III .05-.09, on hind tibia .05-.12.

Alate Vivipara. Head and thorax brown; abdomen bright green; appendages dusky brown. Measurements same as aptera or slightly larger. Hairs spinelike; .10 long on hind tibia. Rostral IV+V .12-.13 barely attaining 2d coxa.

Dimorph. Pale green; without dark markings. Mosaic pattern consisting only of a pair of median dorsal plates on each segment from pronotum to tip of abdomen; remainder of dorsum rugose. Armed with flabellate hairs along margins as follows: Four on vertex, two on antennal I, and one on each segment posterior to pronotum; flabella somewhat pointed, the pair on the tip of the abdomen quite slender. Body length .50-.70; hind tibia .13; antenna .37-.40.

Dimolt (Adult Developed from Dimorph). Same as apterous summer vivipara except smaller. Body length 1.6; hind tibia .60; antenna 1.0, III+IV (coalesced) .36, V .13, VI .10+.20.

Ovipara. Apterous. Head and prothorax dark brown; remainder of body dark olive-green, pale around cornicle bases; appendages sordid to dusky especially distally and on hind tibia. Cauda and cornicle pale. Body length 2.1; antenna 1.1, III .30, IV .20, V .17, VI .10+.22 (division between III and IV may be indistinct); hind tibia .70, slightly swollen on proximal half and bearing scattered small sensoria over nearly entire length.

Male. Apterous. Olive-green to brownish. Body length 1-1.35; hind tibia .60-.80; antenna 1.1-1.2. Hairs as in viviparae.

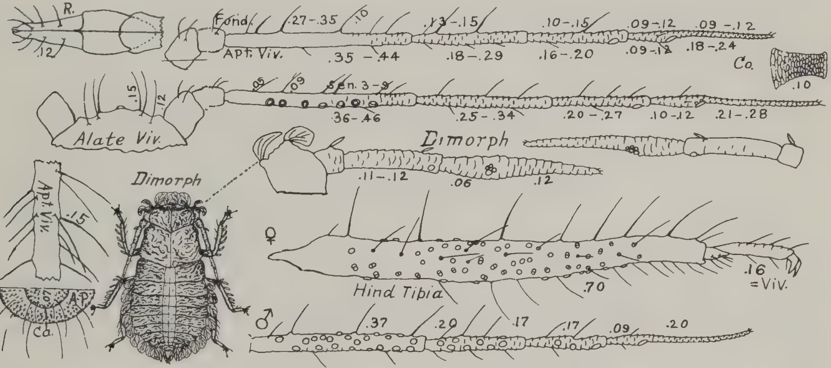

Fig. 107. *Periphyllus negundinis*

Collections. On leaves and twigs of *Acer negundo* and *A. pseudoplatanus*. Generally throughout region. Fundatrices March 12 to May 4, apterous summer viviparae May 10 to Oct. 31, alate viviparae May 4 to Sept. 27, oviparae Oct. 3 to Nov. 16, males Oct. 3 to 15, dimorphs May 4 to Aug. 19; very common.

Cotypes. Ill. Nat. Hist. Surv. Collection, No. 2775.

Chief Distinguishing Characters. Immaculate green body, long spinelike hairs on appendages, length of unguis (2.5-3 times base) and characters of dimorph (especially dorsal plates and length of unguis), and abundance of latter form.

Periphyllus populicolus (Thomas)

The Cloudy-winged Cottonwood Leaf Aphid

Chaitophorus populicola Thomas, 1877:10; Essig, 1909c:98.
Periphyllus populicola, Gillette and Palmer, 1931:924.

Fundatrix. Rusty brown on head, spreading somewhat onto prothorax, and sometimes laterally on mesothorax; abdomen deep apple-green; antennal VI, and tip of V, entire tarsi and tips of tibiae black or blackish. Body length 2.5-2.75; antenna about .90, or with III and IV fused, total length .75.

Apterous Vivipara. Head brown; body yellowish or greenish with rather solid mottling of brownish, leaving only a pale V-shaped area on dorsum, pale ring about each cornicle and pale median area on terminal abdominal segments; cornicle and legs pale. Body length 2-2.5; hind tibia .9-1.0, hind tarsal II .16-.19; antenna 1.3. Hairs spinelike on vertex .06-.08 long;

on body a few fine and .03-.04, others heavy .04-.07 and numerous; on hind tibia fine .06-.07, nearly erect, length hardly exceeding diameter of tibia. *Young.* Rusty anteriorly and with median dorsal spot on abdomen, remainder of abdomen pale greenish yellow with pale median V pattern on thorax.

Alate Vivipara. Same as aptera except abdomen with dusky bands and lateral spots and sometimes appendages slightly longer. Body length 1.5-2. Secondary sensoria on antenna circular, with narrow rims. Hairs spinelike and fine; on body .08 long; on hind tibia .04-.05. Rostral IV+V .14 hardly attaining 3d coxa. Fore wing with veins heavily bordered with smoky; hind wing with veins but faintly bordered; scattered setulae on posterior border of stigma.

Ovipara. Apterous. Head, pronotum, dorsolateral portions of meso- and metanotum and abdominal I and median areas of abdominal II to V brown, rest of dorsum pale yellow giving effect of pale V; with cornicle bases pale green and with green extending anteriorly near lateral margin to abdominal I; tibiae pale with black tips except hind tibia which is blackish. Body length 2-2.9; hind tibia .75-.80; antenna .95. Hind tibia with proximal seven-tenths moderately swollen and bearing numerous sensoria.

Male. Alate. Head and thorax black; abdomen dark olive-brown with black dorsal bands and lateral areas; cornicle yellow; appendages dusky. Body length 1.8; antenna 1.2-1.3, III .45, IV .25, V .20, VI .12+.16, sensoria numerous on III, IV and V. Otherwise as in alate vivipara.

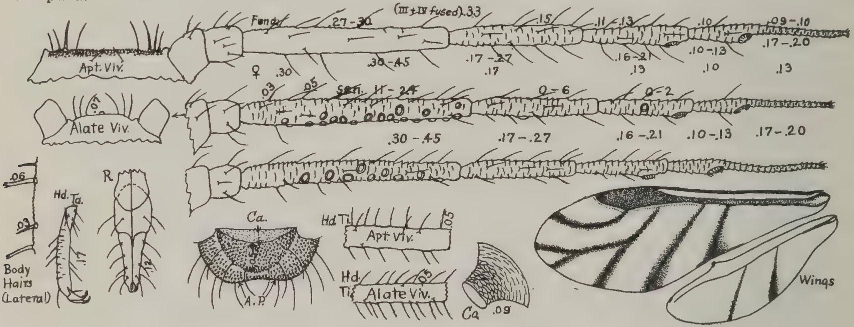

Fig. 108. *Periphyllus populicolus*

Collections. On leaves and twigs of *Populus acuminata, P. sargenti* and *P. angustifolia.* Throughout region. Fundatrices April 30 to May 23, apterous viviparae May 7 to Oct. 23, alate viviparae May 29 to Oct. 20, oviparae Oct. 2 to 31, alate males Oct. 9 to 31; very common.

Cotypes. Ill. State Nat. Hist. Surv. Collection, No. 8177.

Chief Distinguishing Characters. Heavily bordered veins of the fore wing, color pattern of the aptera and sinuate anal plate.

Periphyllus salicicorticis (Essig)

Symydobius salicicorticis Essig, 1912a:731.
Periphyllus salicicorticis, Gillette and Palmer, 1931:925.

Apterous Vivipara. Head and pronotum dark, mesonotum pale with speckles and lateral spots dark, rest of body dingy or greenish yellow or rusty brown with darker dashes and lateral spots, dashes often broken, with light area about each cornicle; cornicle and appendages pale; tips of tibiae hardly dusky. Body 2.3 by 1.3; hind tibia .80-1.1; hind tarsal II .14-.16; antenna 1.0, III .30-.37, IV .14-.22, V .14-.18, VI .10-.12+.10 to .13; cornicle .07-.10; cauda .07. Rostral IV+V .25, attaining middle of abdomen. Hairs simple, of two kinds; on body and vertex, some spinelike .12-.15 long and others fine .05-.06; on antenna fine .03-.05 (diameter of antennal III .03); on hind tibia fine .05-.06 long.

Alate Vivipara. Measurements same as apterous vivipara or slightly larger. Head and thorax blackish; abdomen pale dingy green with dorsal dashes and lateral areas. Body length 1.5-2.3; hind tibia .9-1; antenna 1.4, III .40-.48, IV .21-.26, V .20-.23, VI .12-.14+.11-.16, secondary sensoria 10-20 on III, 0-2 on IV*. Cornicle truncate, shorter than broad. Cauda semilunar; anal plate entire. Hairs on body of two kinds, one kind moderately heavy, spinelike, .09 long, the others fine, .06 long; on vertex same as on body; on antenna fine, .04-.05; on hind tibia .05 (diameter of tibia .04, of antenna .03). Posterior border of stigma of fore wing with scattered setulae. Rostral IV+V .22, attaining abdominal I or II.

Ovipara. Apterous. Color similar to apterous vivipara. Body length about 2; hind tibia .80; antenna .85, III .25, IV .15-.20, V .13-.17, VI .10+.06; rostral IV+V .20. Hind tibia only slightly swollen on proximal half and bearing scattered small convex sensoria.

Male. Apterous. Golden to dingy brown with head, prothorax and dorsal dashes on all segments dark or dusky brown. Body length 1.6; antenna .85, bearing sensoria on III, IV and V.

Collections. On *Salix* sp., on bark of older limbs and trunk, usually at or beneath the surface of the ground. Colorado: Fort Collins, Denver, Antonito, and Rocky Ford. Idaho: Parma. Fundatrices May 2, apterous summer viviparae July 1 to Sept. 23, alate viviparae May 28 and Aug. 11, sexuales Oct. 10 to 31; rather common.

Cotypes. Essig and Colo. Agr. Exp. Sta. Collections.

This species is exceedingly difficult to separate from the form here determined as *P. macrostachyae.* Indeed the slightly longer hairs, longer rostral IV+V (.22-.25 not .18-.20), lighter coloration, and the habitat at the surface of the ground seems to be the only distinguishing characters.

Not figured on account of similarity to *P. macrostachyae.*

Periphyllus saliciniger (Knowlton) n. comb.

Neothomasia salicinigra Knowlton, 1927b:199 and 1928e:233.

Apterous Summer Vivipara. "Black, lighter on mid-dorsal line"; antenna dark except III and base of IV; legs black. Body length 1.75-2; across eyes .44; hind tibia .60-.65; hind tarsal II .13-.15; rostrum attaining between 2d and 3d coxae. Hairs on body of two kinds, one kind simple, fine hairs and others heavy spinelike hairs with double points, bifid.

Alate Vivipara. "Black," (cleared and mounted), abdomen with dark dorsal bands and lateral spots; antenna except base of III, cornicle and legs black; wings hyaline. Body length 1.35-2; across eyes .40; hind tibia .60-.75; hind tarsal II .12-.14; rostrum attaining between 2d and 3d coxae.

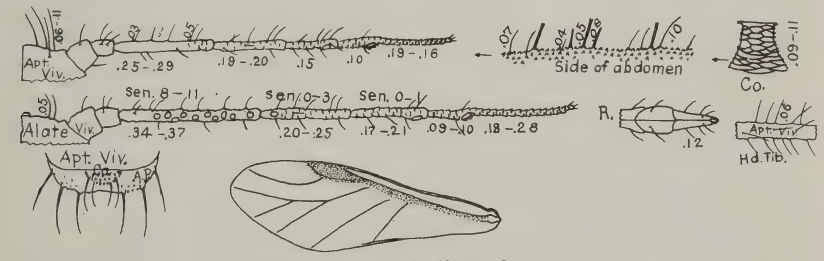

Fig. 109. *Periphyllus saliciniger*

Collections. On *Salix* sp. on bark of twigs. Utah: Cedar Canyon. Colorado: Manassa. Fundatrices May 22, apterous and alate viviparae July 8; rare.

Type. Knowlton Collection.

Chief Distinguishing Characters. Hyaline wings, long unguis (twice the length of base of VI), short rostral IV+V (.12 in length, about half the length of unguis) and double-pointed or bifid spines on the body of the apterous vivipara.

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*Three alate viviparae were taken on which the secondary sensoria were not evident on the antenna, but in all other characters they appear to agree with the other examples.

[Genotype *Periphyllus testudo* van der Hoeven*]

The European Maple Aphid

Periphyllus testudo van der Hoeven, 1863:1.
Phillophorus testudinatus Thornton, 1852 (desc. not pub.).
Chaitophorus testudinatus (Thornton), Baker, 1918:87.
Periphyllus testudinatus (Thornton), Theobald, 1929:37 and 355.

Alate and Apterous Vivipara. Dark green to gray; wings hyaline, veins not bordered. Body length 2.5-3; antenna shorter than body; unguis 2-3 times as long as base of VI but shorter than III. Hairs simple; on body moderately spinelike, .15-.25 long; on hind tibia fine, .13-.17 long, length 2-3 times diameter of tibia. Rostral IV+V .12 attaining about to 2d coxa. Flabellate dimorphs produced, bearing six longitudinal rows of dorsal plates. Flabella broadly rounded. Male alate.

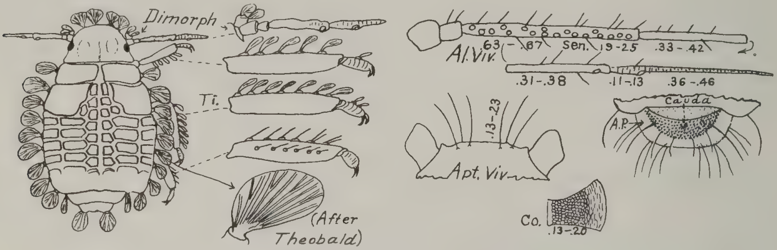

Fig. 110. *Periphyllus testudo*

Host. Leaves of *Acer* sp. (Not recorded in region.)

Data for description and drawings were obtained from Theobald (op. cit.) and from specimens determined by van der Goot.

Periphyllus utahensis (Knowlton)

Neothomasia utahensis Knowlton, 1928e:234.
Periphyllus utahensis, Knowlton, 1936f:211.

Apterous Summer Vivipara. (Mounted in balsam), antennal I, distal end of IV, entire V and VI, femora, knees and tips of tibiae, entire tarsi and cornicle blackish. Body 2; across eyes .50; hind tibia .80-.90; hind tarsal II .15-.17; antenna 1-1.3, III .34-.40-".47," IV .14-.22, V .12-.18, VI .10+.11-.15; rostral IV+V .15-.17, attaining 3d coxa or abdominal I. Hairs rather spinelike; on vertex .07-.13; on antennal III and hind tibia .05; on sides of abdomen .06-.11 long. Cauda semilunar, bearing 4 hairs. Cornicle with reticulation.

Alate Vivipara. Dusky brown with blackish lateral areas and crossbands on abdomen; cornicle and cauda black; appendages except basal part of antennal III, dusky to blackish. Fore wing with veins dusky and narrowly bordered, wing margins faintly cloudy. Body length 2-2.6; across eyes .50; hind tibia .85-1.1; hind tarsal II .15; antenna 1.3-1.5, III .50-.55, IV .22-.28, V .17-.23, VI .09-.12+.14-.18; cornicle .10; rostral IV+V .20, attaining abdominal III.

Hairs rather fine; on vertex .06-.09; on III of antenna, on hind tibia and on sides of abdomen .05 long.

Collections. On *Salix* sp., in large colonies, on leaves and bark of twigs. Colorado: Antonito, Manassa, Stove Prairie (near Bellvue) and near Fort Collins. Utah: Hyde Park, North Logan, Harrisville and Hooper. Apterous viviparae June 24 to Aug. 21, alate viviparae June 22 to Aug. 21; apparently not very common.

Cotypes. Knowlton Collection.

This species is close to *P. macrostachyae* and *P. salicicorticis* but differs from both in longer III and IV and unguis which is longer than base of VI (usually about 1.5 times instead of about equal). It differs from *P. salicicorticis* in darker coloration and in the feeding habit, on twigs and leaves, instead of on bark of larger limbs and trunk at and beneath the surface of the ground.

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*This name should be *testudinacea* (Fernie) (1852. Naturalist, Morris, III, p. 265) according to Essig (1952. The Aphid Genus *Periphyllus*. Univ. of California Press, Berkeley and Los Angeles, p. 121 and 144). Dr. Essig's work came to hand after this manuscript had been sent to the printer.

However, the range of variation grades very close and indeed intergrading individuals occur in the Colorado collection so it is impossible to draw a separating line between the three so-called species.

It appears likely that these three forms are only variations of *P. macrostachyae* but biological investigations should be conducted to settle the matter.

Genus **Sipha** Passerini

Passerini, 1860:29; Baker, 1920a:35.

Characters. Body flat and elongate, covered with long, stout spines. Frontal tubercles lacking. Antenna shorter than body; five-segmented, bearing hairs not longer than diameter of segments bearing them; secondary sensoria circular, large; unguis longer than half base of VI. Cornicle truncate, short, not longer than broad. Cauda knobbed; anal plate rounded, often hidden by terminal segment of abdomen. Living on leaves of grasses in wet places. Genotype (fixed by Passerini, 1860), *Aphis glyceriae* Kaltenbach.

Key to Species of Sipha

1. Body surface denticulate; unguis not shorter than base (p. 103)........*glyceriae*
.... Body surface smooth........2
2. Unguis shorter than base (p. 103)........*agropyronensis*
.... Unguis longer than base (not taken in region)........*flava*

Sipha agropyronensis (Gillette)

Chaitophorus agropyronensis Gillette, 1911a:442.
Sipha agropyronensis, Gillette and Palmer, 1931:915.

Alate Vivipara. Head and thorax brown to black; abdomen pale green with faint dusky dashes. Body length 1.6-1.9; hind tibia .6; hind tarsal II .20; antenna .65. Rostral IV+V broad in lateral aspects, slender obtuse in ventral aspect, .11 long, not attaining 3d coxa. Anal plate slightly emarginate. Body surface smooth. Hairs simple; on body rather heavy spinelike, numerous, .02-.05 long; on vertex, slightly heavier; on hind tibia rather fine, semierect .03-.05. Fore wing with media either once- or twice-branched. Other characters as described for genus.

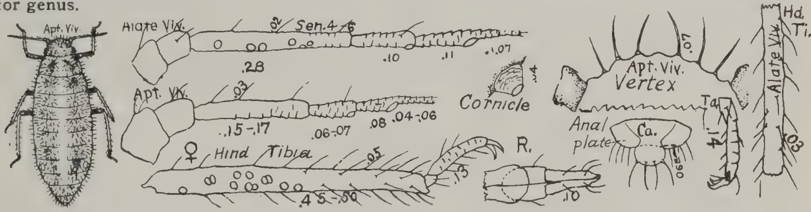

Fig. 111. *Sipha agropyronensis*

Apterous Summer Vivipara. Body 1.8 by .7; hind tibia .5; hind tarsal II .15; antenna .43-.49. Otherwise as in alate vivipara except that hairs are slightly heavier and longer.

Ovipara. Apterous. Same as apterous vivipara except hind tibia proximal half to two-thirds of which is slightly swollen and bearing 10-12 large, often paired or double, sensoria.

Collections. On upper surface of leaves of *Agropyron* sp. Colorado: Fort Collins, Boulder, and Denver. Apterous summer viviparae May 26 to Sept. 18, alate viviparae May 31 and July 23, oviparae Oct. 13; fairly common.

Type. U.S.N.M. Paratypes, Colo. Agr. Exp. Sta. Collection.

[Genotype *Sipha glyceriae* (Kaltenbach)]

Aphis glyceriae Kaltenbach, 1843:113.
Sipha glyceriae, Hille Ris Lambers, 1934:32.

Apterous Summer Vivipara. Body elongate, egg-shaped flattened. Green with pale dorsal stripes and covered with short, stiff bristles and smoky denticles. (Cleared and mounted), body immaculate; appendages, cauda and tip of rostrum dusky; cornicle black. Body length 1.70; antenna five-segmented, .55 long; hind tibia .45-.50; hind tarsal II .13; rostrum hardly attaining 2d coxa. Hairs on body numerous. heavy, spinelike and .07-.11 long; on hind tibia fine, .06 long, rather numerous.

Alate Vivipara. Head and thorax black; abdomen green, dorsum strewn with many black speckles, each bearing a pale hair. Surface roughened by scattered denticles. Antenna and cornicle blackish; tibiae, cauda, anal plate and tip of rostrum dusky. Antenna either five- or six-segmented; about .75 long. Wings hyaline; stigma greenish, media usually twice-forked but very variable, sometimes once-forked. Body length about 1.90; across eyes .45; hind tibia .62. Hairs heavy, spinelike and numerous; .09 long on body and vertex; on antenna and hind tibia as in apterous vivipara.

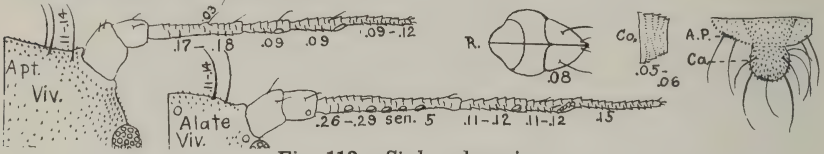

Fig. 112. *Sipha glyceriae*

Hosts. On leaves of the following grasses: *Glyceria fluitans, Juncus lampocarpus, Phalaris arundinacea, Poa annua* and others. Dropping off and feigning death when disturbed. (Not reported from region.)

Data for above description and figures taken from specimens determined by Hille Ris Lambers.

Subtribe **Pterocommina** Baker

Baker, 1920a:35.

Characters. Prominent hairs on body and appendages. Frontal tubercles undeveloped. Lateral tubercles well developed. Ocular tubercle present. Cornicle more or less elongate; cylindrical or clavate. Cauda semilunar; anal plate entire. Gonophophyses 3. Living on bark of trees.

This group shows the following affinities to Aphini in which group it has been placed by van der Goot: Three gonopophyses and elongate cornicle. The following characters agree with Chaitophorina: Hairiness of body and appendages, shape of cauda and anal plate (similar to *Periphyllus)* and frontal tubercles. The following characters disagree: Shape of cornicle and number of gonopophyses (4 in Chaitophorina). The Drepanosiphina also exhibit 3 gonopophyses, and elongate cornicles. It seems best to leave the group under the Panaphini.

Genus **Pterocomma** Buckton

Pterocomma Buckton, 1879:142; Baker, 1920a:36.
Plocamaphis Oestlund, 1922:122.

Characters. Cornicle elongate (in *braggii* minute) with distinct flange (except in *braggii* and *flocculosa).* Antenna shorter than body, bearing pointed hairs as long to longer than diameter of segments bearing them. Cauda semilunar; anal plate entire. Body and appendages conspicuously hairy. Lateral and ocular tubercles well developed. Living on bark of *Salix* and *Populus*. Genotype (monotypical), *Pterocomma pilosa* Buckton.

Key to Species of Pterocomma

1. Cornicle uniformly cylindrical........ 8
.... Cornicle often or always swollen........ 2
2. Cornicle sometimes swollen and sometimes cylindrical; unguis longer than cornicle (p. 105)........ *beulahensis*
.... Cornicle always swollen; unguis not longer than cornicle (except in *braggii* and *pilosa*)........ 3
3. Cornicle with flange........ 4
.... Cornicle without flange........ 7
4. Cornicle distinctly more than twice as long as wide; proximal one-fourth not swollen........ 5
.... Cornicle about twice as long as wide, swelling beginning at base (p. 110)........ *smithiae*
5. Cornicle at middle swollen to twice diameter at base; bright orange (p. 109)........ *salicis*
.... Cornicle swollen less than 1.5 times diameter at base; not bright orange........ 6

6. VI with unguis 1.6-2 times base and equalling length of cornicle (p. 105)....................*bicolor*
.... VI with unguis 1-1.5 times base and shorter than cornicle (p. 108)....................*populifoliae*
7. Cornicle large, equalling hind tarsal II in length (p. 107)....................*flocculosa*
.... Cornicle minute, much shorter than hind tarsal II (p. 106)....................*braggii*
8. Tibial hairs .05-.07 long (p. 109)....................*pseudopopulea*
.... Tibial hairs .10-.20 long (p. 107)....................*pilosa*

Pterocomma beulahensis (Cockerell)

Cladobius beulahensis Cockerell, 1904:263.
Pterocomma beulahensis, Baker, 1916a:282; Gillette and Palmer, 1931:928.

Fundatrix. Body length 3.5; hind tibia 1.6; antenna 1.5.

Apterous Summer Vivipara. Yellowish olive-green. Body length 3-4; hind tibia 1.9-2; antenna 1.9-2. Hairs fine; on vertex and body .08-.10 long.

Alate Vivipara. Same as apterous vivipara in measurements and color; wings hyaline. Rostrum hardly attaining 3d coxa. Cornicle slightly swollen to cylindrical.

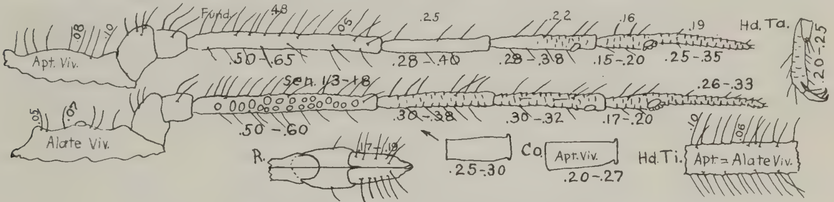

Fig. 113. *Pterocomma beulahensis*

Collections. On *Populus tremuloides,* on bark and twigs. Colorado: Fort Collins, Pingree Park, Idaho Springs, Manassa, and Lost Lake. New Mexico: Beulah. Utah: Generally in northern half of the state. Idaho: Mink Creek and Emigration Canyon. Fundatrices June 11, apterous summer viviparae June 13 to July 5, alate viviparae May 26 to Aug. 4; rather rare.

Cotypes. U.S.N.M.

Chief Distinguishing Characters. Length of unguis (usually longer than half of III and 1.25-1.5 times length of cornicle), shape of the cornicle (distinctly swollen to practically cylindrical) and host plant.

Pterocomma bicolor (Oestlund)

The Reddish Brown Willow Bark Aphid

Melanoxanthus bicolor Oestlund, 1887:36.
Pterocomma bicolor, Baker, 1916a:284.
Clavigerus bicolor, Gillette and Palmer, 1931:932.

Fundatrix. Same as apterous summer vivipara except for the shorter unguis, about .18, not longer than base of VI.

Apterous Summer Vivipara. Young. Pale greenish. *Adult.* Reddish brown to dusky greenish yellow, with slight powdery markings on intersegmental lines; legs, cornicle, and antenna yellowish. Body length 3.0-4.0; hind tibia 1.5-2.0; hind tarsal II .20-.22; antenna 1.5-2.0, III .40-.50, IV .25-.30, V .25-.29, VI .12-.18+.24-.30; cornicle .25-.30. Rostrum attaining between 2d and 3d coxae.

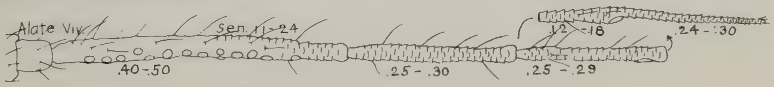

Fig. 114. *Pterocomma bicolor*

Alate Vivipara Color and measurements same as apterous vivipara or slightly longer. Wings hyaline.

Hairs fine, numerous; on vertex and body .10 long; on hind tibia .10-.12 (diameter of tibia .06). Cornicle 4 times as long as wide, somewhat swollen in distal half, very slightly imbricated, flange distinct. Rostral IV+V .17-.18 long, hardly attaining 2d coxa. Lateral tubercles well developed.

Ovipara. Greenish olive-brown. Measurements same as in vivipara. Hind tibia only slightly swollen and bearing numerous small sensoria on proximal half.

Male. Alate. Color same as in alate vivipara. Body length 2.30; antenna 1.80; numerous small sensoria on III, IV and V.

Egg. Newly-laid, pale olive-yellow; later, black; naked. Size 1.25 by .50.

Collections. On bark of *Salix* sp. Generally throughout region. Fundatrices April 2 to 18, alate and apterous summer viviparae April 2 to Nov. 6, sexuales Oct. 2 to Nov. 13; extremely common and abundant.

Cotypes. Univ. of Minn. Collection.

This form differs from *P. populifoliae* as follows: Shorter cornicle (.25-.35, about the same as unguis, instead of .33-.40 and longer than unguis), shorter antenna (1.5-2 instead of 2-2.25). These two forms are very closely related and really rank intermediate between *P. bicolor* and *P. populifoliae* Fitch, as described by Baker (op. cit.). The unguis in summer viviparae of Colorado examples from *Salix* hardly ever attains twice and sometimes hardly more than 1.5 times length of base of VI and varies from once to 1.5 times base in Colorado examples from *Populus,* but is same length as base in fundatrices of both forms. There is sufficient overlapping so that no distinct line can be drawn and very few reach the extremes given by Baker (op. cit.) for the two species. Possibly these forms are but variations of a single species. At present it seems best to determine the *Salix* form as *P. bicolor* and the *Populus* form as *P. populifoliae,* awaiting biological tests.

Pterocomma braggii (Gillette and Palmer) n. comb.

Plocamaphis braggii Gillette and Palmer, 1929a:1 and 1931:930.

Fundatrix. Same as summer apterous vivipara except as follows: Appendages darker; hind tibia shorter (1.27) and antenna slightly shorter (1.50).

Apterous Summer Vivipara. Yellowish to dusky brown, with blackish lateral areas and lighter, sordid tan and powdery intersegmental lines and median line; hairy; appendages sordid yellowish brown, blackish on tarsi, tips of tibiae and antennal I, II, V and VI; cornicle pale or concolorous with body. Body length 2.5-3; hind tibia 1.5-1.8; hind tarsal II .20; antenna 1.5-1.9; cornicle .05-.06. Hairs pointed, numerous; on antenna erect, slightly longer than diameter of III; on hind tibia about same length but slightly shorter than diameter of tibia; on body .08-.10 long. Lateral tubercles conspicuous on prothorax and all abdominal segments except VIII. Ocular tubercle inconspicuous. Cornicle minute, difficult to discern, slender, cylindrical, hardly swollen, curved inward, without flange and constricted at opening, imbricated. Rostral IV+V .21 long, broadly obtuse; attaining abdomen.

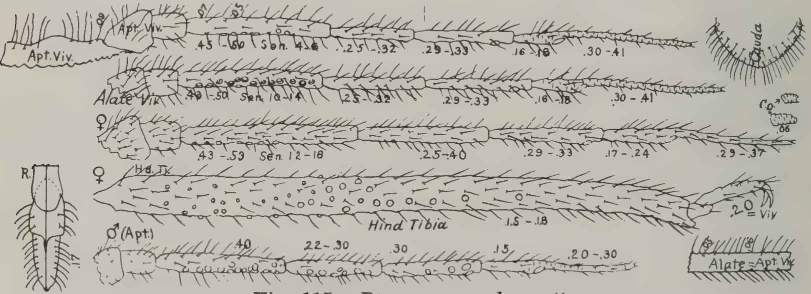

Fig. 115. *Pterocomma braggii*

Alate Vivipara. Head and thorax blackish; abdomen yellowish dusky brown with blackish lateral areas; appendages sordid to dusky yellowish brown, darker distally; cornicle pale yellow-brown and inconspicuous; wings hyaline, fore wing with media once-branched (in the 4 examples taken), posterior edge of stigma with scattered setulae. Measurements as in apterous vivipara.

Ovipara. Apterous. Color and measurements as in viviparae except body slightly more elongate. Venter of abdominal VI, VII and VIII bearing short wax filaments. Hind tibia very slightly swollen on proximal half and bearing thinly scattered minute sensoria.

Male. Apterous. Color same as in viviparae. Body length 2.30; hind tibia 1.20; antenna 1.1.

Collections. On roots of *Salix* sp. Colorado: Fort Collins and Boulder. Fundatrices May 17, apterous summer viviparae Sept. 7 to 22, alate viviparae Sept. 7, oviparae Sept. 22 to Nov. 5, males Oct. 18 to Nov. 5; apparently rare.

Type. U.S.N.M., No. 41453. Paratypes, Colo. Agr. Exp. Sta. Collection.

This species resembles very closely *Fullawaya salici-radicis,* but differs in the presence of a minute cornicle instead of none.

Pterocomma flocculosa (Weed) n. comb.

The Flocculent Willow Aphid

Melanoxanthus flocculosus Weed, 1891:291.
Pterocomma flocculosa, Baker, 1916a:286.
Plocamaphis flocculosa, Gillette and Palmer, 1931:929.

Fundatrix. Same as summer aptera except as follows: Slightly shorter antenna, about 2, III .50, IV .30, V .32, VI .20+.32; hind tibia 1.20.

Apterous Summer Vivipara. Dull yellowish brown with a pair of longitudinal rows of black areas; very flocculent; cornicle bright orange; legs light brownish to dusky; tarsi and tips of tibiae blackish. Body length 2.5-3.5; hind tibia 2-3; antenna 2.65-3. Hairs as in alate vivipara.

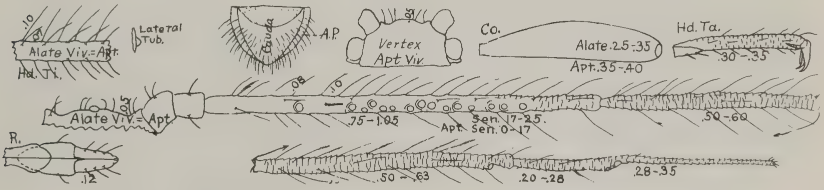

Fig. 116. *Pterocomma flocculosa*

Alate Vivipara. Same color and measurements as apterous vivipara. Wings hyaline, except for cubital and anal veins on fore wing which are slightly smoky. Hairs pointed, numerous on appendages; on body .05 long and very sparse. Rostral IV+V .11-.13, broad, attaining about to 3d coxa. Cornicle swollen and without flange, held against body. Fore wing with media twice-forked.

Ovipara. Apterous. Color as in summer aptera. Body length 4.10, somewhat elongated posteriorly; hind tibia 1.5, very slightly swollen on proximal half and bearing a few scattered minute sensoria.

Male. Apterous. Color as in vivipara. Body 2; hind tibia 1.35; antenna 1.90, III .52, IV .38, and V .36, each with numerous small sensoria, VI .18+.26.

Collections. On bark of *Salix* sp. Colorado: Fort Collins and Eldora. Fundatrices April 16, apterous summer viviparae July 16 to Aug. 8, alate viviparae June 7 to Aug. 8, sexuales Oct. 23; rare.

Chief Distinguishing Characters. Peculiar shape of the cornicle and cauda and abundant flocculence.

[Genotype *Pterocomma pilosa* Buckton]

Pterocomma pilosa Buckton, 1879:143.

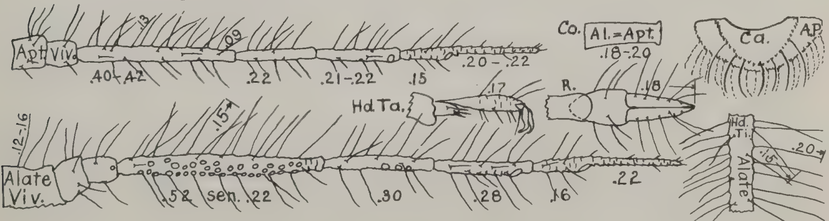

Fig. 117. *Pterocomma pilosa*

Apterous Summer Vivipara. Pale green, spotted with darker green in two longitudinal rows, head, pro- and mesonotum, dorsal bands and lateral areas on abdomen, appendages, cauda and anal plate black; cornicle pale to dusky. Body 2-3 by 1.06-1.60; antenna 1.06-1.50; cornicle .20*. Whole insect pilose; hairs fine on body and vertex .08-.12 long; on antenna erect, numerous, length 2-3 times diameter of III; on hind tibia erect, numerous, .10-.15, about twice as long as diameter of tibia.

Alate Vivipara. Head and thorax pale ferruginous brown; abdomen ashy gray with broad brown bands and lateral areas on each segment; appendages pale brown to black. Body 3.04-3.60 by 1.06-1.50; antenna 1.77, unguis hardly longer than base of VI; cornicle cylindrical, .20*. Rostrum attaining beyond 3d coxa. Body and appendages hairy. Hairs fine, numerous; on body and vertex .12-.16 long; on antennal III erect, length about 3 times the diameter of III; on hind tibia 2-3 times as long as diameter of tibia. Wings long and pointed and curved inward on costal and apical margins; cauda not projecting beyond anal plate.

Host. On bark of twigs of *Salix* sp. (Not recorded from region.)

Data for above description taken from description and figures by Buckton (op. cit.) and from specimens determined by Hille Ris Lambers. The figures were drawn from the latter.

Pterocomma populifoliae (Fitch)

The Reddish Brown Poplar Aphid

Aphis populifoliae Fitch, 1851:66.
Pterocomma populifoliae, Baker, 1916a:280; Gillette and Palmer, 1931:933.

Fundatrix. Same as apterous summer vivipara except the shorter unguis, about .17, not longer than base of VI.

Apterous Summer Vivipara. Reddish brown to dusky greenish yellow, with slight powdery markings on intersegmental lines; cornicle and appendages yellowish with distal ends of segments and tarsi black. Body length 3-4; hind tibia 1.5-2; hind tarsal II .20-.24; antenna 2-2.25. Hairs fine, numerous; on vertex and body .10-.12; on hind tibia .07-.13 (diameter of tibia .09). Cornicle moderately swollen.

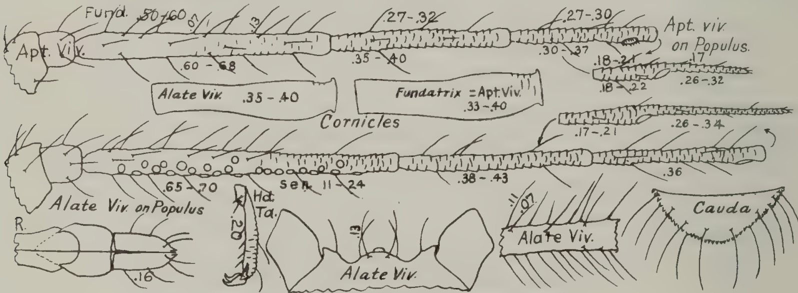

Fig. 118. *Pterocomma populifoliae*

Alate Vivipara. Color and measurements same as in aptera. Wings hyaline. Rostral IV+V .16-.17, attaining between 2d and 3d coxae.

Ovipara. Apterous. Same as apterous summer vivipara except hind tibia the proximal seven-tenths of which is distinctly swollen and thickly covered with numerous small tuberculate sensoria.

Male. Alate. Similar to alate vivipara except the antenna which bears numerous sensoria on III, IV and V.

Collections. On bark of *Populus angustifolia, P. tremuloides* and *P.* sp. Colorado: Fort Collins and Manassa. Utah: American Fork Canyon, Hyde Park, Mount Nebo, Morgan and Indian Canyon. Wyoming: Centennial. Fundatrices April 18, apterous summer viviparae April 25 to June 8, alate viviparae May 8 to June 8 and Oct. 10, oviparae Oct. 27, males Oct. 30; very common.

Cotypes. U.S.N.M.

Chief Distinguishing Characters. Shape of cornicle (moderately swollen on distal half) and length of cornicle (.33-.40, longer than unguis).

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*Buckton gives the length of the cornicle in apterous female as .12 and in alate female as .38. Surely there is some error here. In all other characters the specimens sent by Hille Ris Lambers agree reasonably well with Buckton's description.

Pterocomma pseudopopulea n. sp.

The American Poplar Bark Aphid

Pterocomma populea (Kaltenbach) (misidentification), Gillette and Palmer, 1931:928.

Fundatrix. Silvery gray due to fine pulverulence, tinged with pinkish anteriorly and dusky posteriorly; rostrum mostly blackish. Body length 4; antenna 1.30. Otherwise as in apterous summer vivipara.

Apterous Summer Vivipara. Yellowish olive-brown; slightly pulverulent. Body 3-4; hind tibia 1.2-1.8; antenna 1.2-1.7. Lateral tubercles well developed. Cornicle cylindrical, faintly rugose. Hairs as in alate vivipara.

Alate Vivipara. Measurements and color same as apterous vivipara or with slightly longer appendages. Wings hyaline. Hairs pointed, numerous; on vertex and body .07-.09; rostrum broadly obtuse, attaining abdomen.

Ovipara. Apterous. Same as apterous vivipara except hind tibia which is very slightly swollen and bearing numerous small sensoria over nearly entire length.

Male. Alate. Body length 2.2; hind tibia 1.35; antenna 1.6. Otherwise same as alate vivipara.

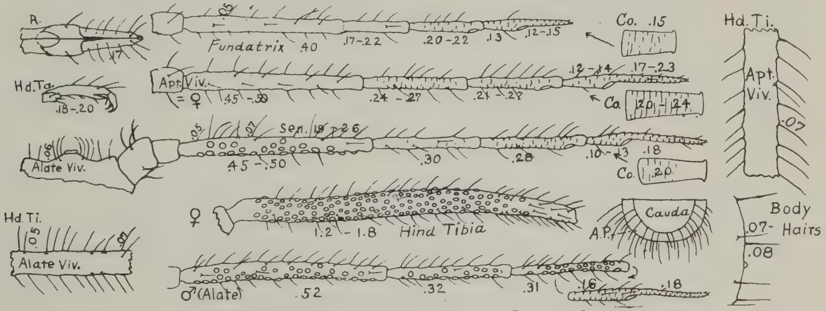

Fig. 119. *Pterocomma pseudopopulea*

Collections. On bark of *Populus sargenti* and *P. nigra* var. *italica.* Colorado: Fort Collins, Estes Park and Longmont. Utah: Smithfield Canyon, Evans, Hyde Park, Mount Nebo and Salt Lake City. Idaho: Twin Falls. Wyoming: Powell. Fundatrices April 19 to May 8, apterous viviparae May 14 to Oct. 25, alate viviparae May 6 to Oct. 10, oviparae Oct. 10 and Nov. 13, males Sept. 18; fairly common.

Type. U.S.N.M., No. 59323. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Cylindrical shape and the length of the cornicle (equal to length of hind tarsal II), short unguis (1-1.5 times base of VI, shorter than half of III), and shortness of the hairs (.05-.07 on hind tibia).

This species disagrees with European specimens of *P. populea* (Kaltenbach), determined by Cholodkovsky and Mimeur, in shorter hairs (the European specimens measuring .10-.15 on vertex and body, .11-.14 on III, .10-.20 on hind tibia). Kaltenbach gave no measurements for hairs.

Pterocomma salicis (Linnaeus)

Aphis salicis Linnaeus, 1758:453.
Melanoxanthus salicis, Buckton, 1879:21.
Melanoxantherium salicis, Theobald, 1929:57.
Clavigerus salicis, Gillette and Palmer, 1931:931.
Pterocomma salicis, Baker, 1916a:283.

Fundatrix. Color same as summer apterous vivipara. Body length 3-4; antenna 1.3-1.4, III .49-.50, IV .20-.25, V .21-.26, VI .14+.09-.11; cornicle .42; hind tibia 1.55; hind tarsal II .20. Other characters as in summer apterous vivipara.

Apterous Summer Vivipara. Bluish to greenish black with pattern of pulverulence on median and intersegmental lines and lateral and dorsolateral areas; cornicle bright orange; legs brownish yellow with tarsi and tips of tibiae black; antenna brownish yellow, dusky distally. Body length 3.3-4; hind tibia 2.2-2.5; hind tarsal II .25; antenna 2-2.2, III .70-.75, IV .40-.50, V .35-.38, VI .20-.23+.18-.21, sensoria usually 2-3 rarely 12 on III. Hairs about as in alate vivipara except hairs on hind tibia .06-.10 (diameter of tibia .10); on body .10-.12. Cornicle greatly swollen in the middle. *Young.* Pale bluish green with pale brown on head; appendages yellowish.

Alate Vivipara. Same as apterous vivipara in measurements and color except antenna which is dark throughout. Wings hyaline, veins bordered with smoky, posterior edge of stigma with a few scattered setulae .04-.05 long. Hairs pointed, numerous; on vertex .10-.11; on antenna .07-.10 (diameter of III .05-.07); on hind tibia erect, .08-.12 long (diameter of tibia .07). Rostral IV+V .17 long, obtuse, attaining between 2d and 3d coxae. Secondary sensoria small.

Ovipara. Same in color as apterous vivipara. Body slightly elongated 4-4.1 long; hind tibia about 1.90 and bearing scattered minute sensoria on proximal third to half; antenna 1.75, III .50-.55, IV .35-.38, V .25-.30, VI .18+.18, cornicle .60. Otherwise as in apterous vivipara.

Male. Apterous. Color same as in ovipara. Body 2-3 long, slender. Antenna 1.70, III .63, IV .34, V .32, each bearing small sensoria, VI .17+.13.

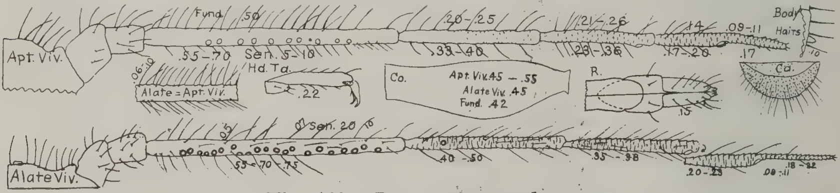

Fig. 120. *Pterocomma salicis*

Collections. On bark of *Salix* sp. Colorado: Fort Collins, Boulder, Eldora, Colorado Springs, Log Cabin (west of Livermore) and Gunnison. Utah: Farmington, American Fork Canyon, River Heights and Mount Timpanogos. Fundatrices May 25 to 29, apterous viviparae May 28 to Oct. 16, alate viviparae May 28 and Aug. 6, sexuales Oct. 16; hardly common.

Chief Distinguishing Characters. Large orange-yellow, swollen cornicle.

Pterocomma smithiae (Monell)

Willow Grove Aphid or Black Willow Aphid

Chaitophorus smithiae Monell, 1879:32.
Pterocomma smithiae, Baker, 1916a:287.
Clavigerus smithiae, Hottes and Frison, 1931a:166; Gillette and Palmer, 1931:934.

Fundatrix. Same color as summer vivipara with considerable variation in depth of color. Body 3-3.25 by 1.70-1.75; antenna 1.20, III .33-.40, IV .20, V .20, VI .13+.09. Otherwise as in summer vivipara.

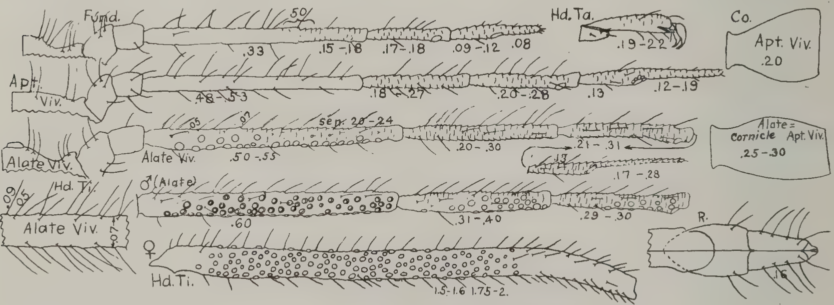

Fig. 121. *Pterocomma smithiae*

Apterous Summer Vivipara. Nymph. New-born, pink or salmon color; later, dark reddish brown, yellowish on head; appendages pale yellowish. *Adult.* Dark rusty brown with slight powder which gives a bluish effect, often with narrow dorsal gray line and lighter about base of each cornicle; appendages and cornicle golden yellow; tarsi, tips of tibiae and of rostrum and of antenna blackish. Body length 3-4; hind tibia 1.65-1.9; hind tarsal II .20-.22; antenna 1.50-1.70, III .48-.53, IV .18-.27, V .21-.28, VI .13+.17-.18; cornicle .25-.30 moderately swollen. Hairs as in alate vivipara.

Alate Vivipara. Same in measurements and color as aptera or with antennal segments slightly longer. Wings hyaline. Hairs fine, numerous; on vertex .06-.07; on body .07-.10; on hind tibia .06. Lateral tubercles well developed. Rostral IV+V. 16 long, broad, obtuse, attaining between 2d and 3d coxae.

Male. Alate. Color same as in viviparae or darker. Body length 2.20-2.56; antenna 1.65-1.75.

Ovipara. Similar to apterous vivipara except body possibly darker, antenna slightly shorter and hind tibia, slightly swollen and bearing numerous small sensoria.

Male. Alate. Color same as in viviparae or darker. Body length 2.20-2.56; antenna 1.65-1.75.

Egg. 1 by .5. At first, honey-yellow; later, black; naked.

Collections. On bark of twigs of *Salix* sp. and *Populus sargenti* and *P.* sp. Throughout region. Fundatrices April 1 to 29, apterous summer viviparae May 5 to Oct. 25, alate viviparae May 6 to Oct. 27, oviparae Oct. 2 to Nov. 14, males Oct. 1 to Nov. 3; very common.

Cotypes. Davis Collection.

Chief Distinguishing Characters. Dark brown to bluish body color and shape and golden yellow color of cornicle.

Specimens submitted to Monell were determined as his species though differing somewhat in size.

Subtribe **Fullawayina** Baker

Baker, 1920a:36.

Characters. Frontal tubercles lacking. Antenna conspicuously hairy. Cauda semilunar; anal plate rounded. Cornicle apparently lacking. Differing from Chaitophorina in the apparent absence of cornicles.

Genus **Fullawaya** Essig

Essig, 1912:716; Baker, 1920a:37.

Characters. Frontal tubercles lacking. Ocular tubercles present. Lateral tubercles well developed. Body and all appendages conspicuously hairy. Cornicle lacking. Cauda semilunar, broader than long.

Gonopophyses 3. Secondary sensoria circular.

Genotype (monotypical), *Fullawaya saliciradicis* Essig.

Only one genus represented in region.

Genotype *Fullawaya saliciradicis* Essig

The Willow Root Aphid

Fullawaya saliciradicis Essig, 1912b:737; Gillette and Palmer, 1931:926.

Apterous Summer Vivipara. Head, pronotum and mesonotum dark brown, remainder dingy yellowish brown to brownish honey-yellow to blackish; finely pulverulent throughout; appendages sordid yellow with antennal I, II, VI and tips of III, IV and V dark and tarsi and tips of tibiae black. Body length 2-3; hind tibia 1.2-1.7; hind tarsal II .22-.26; antenna 1.6-2.

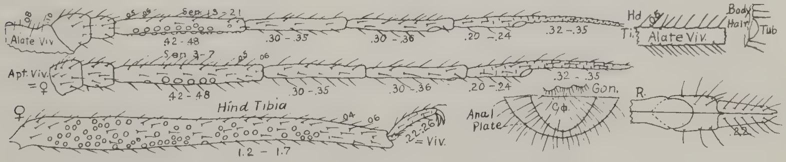

Fig. 122. *Fullawaya saliciradicis*

Alate Vivipara. Color and measurements same as in apterous vivipara.

Hairs pointed, numerous; on antennal III about as long as diameter of III; on vertex and body, .08-.10; on hind tibia .04-.06, shorter than diameter of tibia. Lateral tubercles very large. Rostral IV+V .20-.22, attaining between middle and tip of abdomen. Wings hyaline; media of fore wing twice-branched. Other characters as given for genus.

Ovipara. Apterous. Same as apterous vivipara except body length which is 3.50 with terminal segments somewhat drawn out to form ovipositor and hind tibia which is somewhat swollen on proximal six-tenths and bearing scattered sensoria along eight-tenths of length.

Egg. Newly laid, honey-yellow; later, black; naked.

Collections. On roots of *Salix laevigata*. Colorado: Fort Collins and Boulder. Apterous summer viviparae June 4 to Sept. 24, alate viviparae June 10 to Sept. 7, oviparae Oct. 18 to Nov. 4; rather rare.

Cotypes. Essig and Colo. Agr. Exp. Sta. Collections.

Tribe **Setaphini** n.n.

Setaphidini Baker, 1920a:38.

Characters. Same as in *Setaphis* van der Goot, the only genus.

Genus **Setaphis** van der Goot

Van der Goot, 1916:153; Baker 1920a:39.

Characters. Frontal tubercles rudimentary; antenna five-segmented; unguis of VI shorter than base; secondary sensoria small, circular. Eye three-facetted in aptera. Abdomen bearing a pair of dorsal, fingerlike tubercles situated on VII. Hairs inconspicuous, simple. Cornicle a mere pore situated on a low, broad cone, devoid of hairs. Cauda and anal plate rounded. Fore wing with media once-branched; hind wing much reduced, devoid of cross-veins. Gonopophyses 3.

Genotype (fixed by van der Goot, 1916), *Setaphis luteus* van der Goot.

Setaphis viridis van der Goot

Setaphis viridis van der Goot, 1916:158.

Alate Vivipara. (Mounted, partly cleared), head and thorax, antenna, posterior dorsal tubercles, cornicle and legs dark; veins of both wings bordered. Body length more than 1.20 (uncertain on account of shrivelled body); across eyes .35; antenna 1.03; hind tibia .53; hind tarsal II .12; rostrum attaining 2d coxa. A pair of dorsal tubercles prolonged into hornlike structures on abdomen posterior to cornicles. Cauda rudimentary, rounded; anal plate rounded.

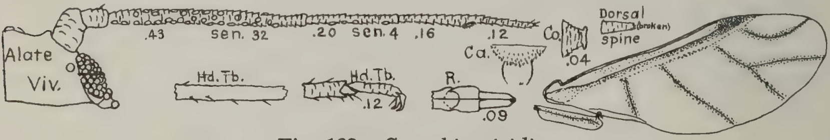

Fig. 123. *Setaphis viridis*

Collections. On *Hibiscus* (?). Colorado: Colorado Springs. A single alate vivipara June 13; rare. Probably imported on another host.

Tribe **Aphini** Gillette and Palmer

Aphidini Thomas, 1877:3.
Aphini Gillette and Palmer, 1932b:369.

Characters. Frontal tubercles more or less developed medially. Secondary sensoria circular or oval. Antenna longer than half of body, unguis filamentous. Ocular tubercle present. Hairs inconspicuous. Wax secretion rare. Cornicle usually elongated, rarely a mere pore or absent, very rarely truncate. Cauda short to elongated. Rostrum four-segmented, V indistinct (fused with IV). Fore wing with radial sector curved and distinct. Tarsal I triangular in lateral aspect.

Key to Subtribes of Aphini Gillette and Palmer

1. Head without prominent frontal tubercles, rarely exceeding vertex; cornicle never longer than 4 times hind tarsus, never reticulated (p. 113)..*Aphina*
   Head usually with prominent frontal tubercles, exceeding vertex; cornicle usually longer than 4 times hind tarsus, often reticulated (p. 229)....................*Macrosiphina*

Subtribe **Aphina** Gillette and Palmer

Aphidina Baker, 1920a:40.
Aphina Gillette and Palmer, 1932b:369.

Characters. Frontal tubercles but slightly developed, on median side only; hardly ever exceeding vertex.* Hairs usually simple, pointed,** short, on antennal III hardly ever longer than diameter of segment bearing them. Lateral tubercles present. Cauda usually shorter than twice length of hind tarsus. Cornicle never longer than 4 times hind tarsus, never reticulated. Other characters as given for tribe.

Key to Genera of Aphina

1.	Tarsi lacking (p. 190)	*Atarsos*
....	Tarsi present	2
2.	Dorsal tubercle present on abdominal VIII (Fig. 218)	3
....	Dorsal tubercle lacking	4
3.	Cornicle with opening on inner side of tip (p. 188)	*Aspidaphis*
....	Cornicle with opening terminal, not on inner side of tip (p. 196)	*Cavariella*
4.	Frontal tubercles entirely lacking; vertex flat	5
....	Frontal tubercles slightly developed; vertex convex	6
5.	Cornicle with knoblike enlargement at tip (p. 200)	*Epameibaphis*
....	Cornicle not knoblike at tip but slightly swollen on inner side near tip (p. 208)	*Pseudoepameibaphis*
6.	Cornicle absent (p. 187)	*Asiphonaphis*
....	Cornicle present	7
7.	Cornicle not longer than width at base	8
....	Cornicle longer than width at base	11
8.	Body of aptera hemispherical (p. 224)	*Siphonatrophia*
....	Body of aptera not hemispherical	9
9.	Body hairs conspicuously flabellate or infundibulate (p. 202)	*Flabellomicrosiphum*
....	Body hairs not as above	10
10.	Cauda shorter than broad; cornicle approximately cylindrical (p. 206)	*Microsiphum*
....	Cauda shorter than broad; cornicle hardly more than a mere pore (p. 228)	*Zyxaphis*
....	Cauda longer than broad (p. 190)	*Brachycolus*
....	Cauda same in length as width (p. 116)	(in part) *Aphis*
11.	Cauda rounded, not longer than broad	12
....	Cauda tapering to spoon-shaped, longer than width at base	13
12.	Frontal tubercles exceeding vertex (p. 113)	*Amphicercidus*
....	Frontal tubercles not exceeding vertex (p. 192)	*Braggia*
13.	Cornicle cylindrical	14
....	Cornicle incrassate or clavate	15
14.	Fore wing with media twice-forked	17
....	Fore wing with media once-forked (p. 226)	*Toxoptera*
15.	Cornicle longer than cauda (p. 211)	*Rhopalosiphum*
....	Cornicle not longer than cauda	16
16.	Cauda elongate, distinctly longer than wide at base (p. 204)	*Hyalopterus*
....	Cauda tapering, not distinctly longer than wide at base (p. 194)	*Brevicoryne*
17.	Cornicle reticulated at distal end	18
....	Cornicle not reticulated at distal end	19
18.	Anal plate with median protuberance resembling rudimentary cauda not longer than base of VI, (treated under Macrosiphina) (p. 246)	*Artemisaphis*
....	Anal plate not as above; cauda longer than base of VI, Macrosiphumlike (treated under Macrosiphina) (p. 287, footnote)	*Macrosiphum coweni* complex
19.	Hairs capitate or infundibulate (p. 199)	*Durocapillata*
....	Hairs simple (p. 116)	*Aphis*

Genus **Amphicercidus** Oestlund

Oestlund, 1922:126; Gillette and Palmer, 1932b:370.

Characters. Vertex convex; frontal tubercles produced on median side, slightly exceeding vertex. Hairs pointed or blunt. Cauda short and broad resembling anal plate, bearing short hairs, no longer than those on vertex.

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*Ocellus not counted as part of vertex in comparisons with frontal tubercles.
**Hairs blunt and heavy-cylindrical in *Braggia*, capitate in *Durocapillata* and in a few species of *Aphis*; funnel-shaped in *Flabellomicrosiphum*.

Cornicle cylindrical, transversely wrinkled. Antenna with numerous sensoria, at least on III of alate vivipara. Fore wing with media twice-forked. Rostrum obtuse, V indistinct, vestigial (fused with IV). Tarsi slender, I triangular in lateral aspect.

Chief Distinguishing Characters. Partial development of frontal tubercles, short broad, semilunar cauda and transverse wrinklelike sculpture of the cornicle.

Genotype (monotypical), *Aphis pulverulens* Gillette.

Key to Species of Amphicercidus

1. Hind tibia of both alata and aptera with sensoria (p. 115)........*maxsoni*

.... Hind tibia of both alata and aptera without sensoria........2

2. Sensoria present on IV in alata; cornicle much longer than hind tarsus (p. 114)........*flocculosus*

.... Sensoria absent on IV in alata; cornicle not longer than hind tarsus (p. 115)....*pulverulens*

Amphicercidus flocculosus (Gillette and Palmer)

Anuraphis flocculosa Gillette and Palmer, 1929a:7.
Amphicercidus flocculosus, Gillette and Palmer, 1932b:372.

Apterous Summer Vivipara. Blackish brown on thorax and abdomen; dull orange or clay color on head, lateral margins of body and base of cornicle; cornicle and appendages yellowish brown to dusky with tarsi and tips of tibiae blackish; entire dorsum covered with powdery secretion. Body length 2.75; hind tibia 1.20-1.50; hind tarsal II .20-.22 and slender; antenna 1.90-2.40; cauda about twice as broad as long; rostrum attaining 3d coxa.

Alata Vivipara. Head and thorax dark brown to dusky yellow-brown; covered with powder; appendages and cornicle as in apterous vivipara. Body length 2.30; hind tibia 1.30; hind tarsal II .20; antenna 2.2; rostrum rather acute, attaining 2d coxa. Cornicle as broad as femora, cylindrical to tapering, marked with very fine and faint transverse wrinkles which are often difficult to see, so that cornicles appear smooth; with narrow but distinct flange. Lateral tubercles present and distinct but weak on prothorax and all abdominal segments. Hairs pointed, .03-.05 long on vertex, body, hind tibia and antenna; on cauda hardly longer than on vertex. Ocular tubercle shallow and broad, inconspicuous. Dorsal integument marked with delicate reticulations.

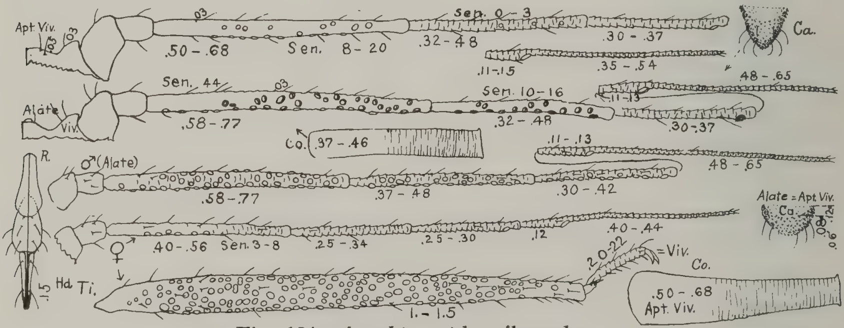

Fig. 124. *Amphicercidus flocculosus*

Ovipara. Body length 2.60-3; antenna 1.40-2; hind tibia with sensoria as figured.

Male. Alate. Same as alate vivipara except as follows: Body length 1.70; cornicle .20 and as figured.

Collections. On leaves and twigs of *Lonicera* sp. and *Symphoricarpos* sp. Colorado: Fort Collins. Utah: Delta. Apterous summer viviparae June 6 to July 20, alate viviparae June 10 to Oct. 28, viviparae Oct. 13 to Nov. 24, males Oct. 28; not rare.

Types. U.S.N.M., No. 41456. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Long cornicle, short cauda, heavy pulverulence on body and numerous sensoria on antenna of aptera.

Amphicercidus maxsoni Palmer

Amphicercidus maxsoni Palmer, 1936a:273.

Apterous Summer Vivipara. Pale amber with dusky dorsal dashes which are often coalesced on abdominal III to VI; markings sometimes very broken or absent. Dorsal surface of head and antenna imbricated; dorsal surface of body marked with denticulate reticulations. Lateral tubercle developed on metathorax. Body length 1.3-1.7; hind tibia .85-1.1; hind tarsal II .13-.14; antenna 1.25-1.55; cornicle slightly curved. Hind tibia bearing 6-10 irregular weak sensoria on proximal fourth to third. Cornicle cylindrical with transverse wrinkles; cauda tapering and triangular, bearing 4-6 hairs on each side and a single dorsal preapical one.

Alate Vivipara. Head and thorax dark; abdomen pale amber with dusky lateral areas and usually with slender yellowish brown dorsal dashes which are considerably broken especially on I, II and III and broader on IV to VIII; all appendages dusky. Body length 1.5-2; antenna 1.5-1.6; rostrum attaining abdominal I. Hairs pointed, sparse, drooping; on vertex, antenna and side of abdomen .01 long; on hind tibia .02 long. Cornicle cylindrical, sometimes slightly narrower in middle and with long transverse imbrications and with flange at tip. Cauda broadly tapering at tip, parallel-sided with slight constriction at base, bearing 4 lateral and 2 dorsolateral pairs of hairs and a single preapical one. Hind tibia with proximal third slightly swollen and bearing about 2-9 faint sensoria.

Ovipara. Characters the same as in apterous vivipara.

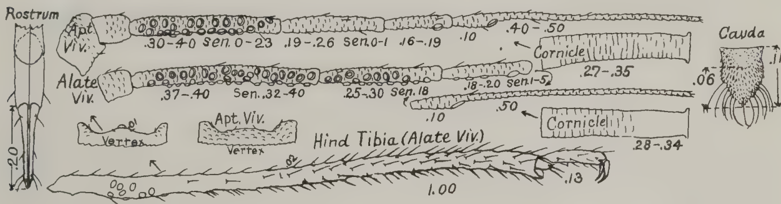

Fig. 125. *Amphicercidus maxsoni*

Collections. On roots of *Eriogonum* sp. Colorado: South Saint Vrain Canyon. Apterous and alate viviparae and oviparae Aug. 26; rare.

Holotype. U.S.N.M., No. 51416. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Presence of sensoria on hind tibia of viviparae, relatively short III (shorter than unguis), long rostral IV+V (.20, much longer than hind tarsus or base of VI) and small size of body (not longer than 2).

Acknowledgements are due to Maxson for the collection and contribution of the specimens and the calling of attention to its undescribed condition.

Genotype *Amphicercidus pulverulens* (Gillette)

Aphis pulverulens Gillette, 1911b:324.
Amphicercidus pulverulens, Gillette and Palmer, 1932b:371.

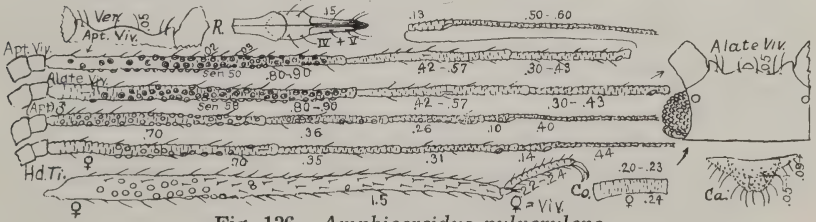

Fig. 126. *Amphicercidus pulverulens*

Apterous Summer Vivipara. Sordid greenish brown; covered with abundant pulverulence; cauda, cornicle and appendages concolorous, with body to dusky. Measurements same as in alate vivipara. *Young.* Pale carneous, often greenish.

Alate Vivipara. Color same as apterous vivipara. Body length 3; hind tibia 1.6-1.7; hind tarsal II .26 and slender; antenna 2.4-2.9; rostrum obtuse, barely attaining 2d coxa. Hairs pointed or slightly knobbed, drooping, .02-.03 long on body; .04 and .05 long on hind tibia. Cornicle cylindrical, weak, without distinct flange, faintly imbricated or transversely wrinkled. Cauda broadly tapering, rounded to semi-lunar, very faintly denticulate, with about 3 lateral and 2 dorsolateral hairs on each side, hardly curved and hardly longer than those on vertex. Ocular tubercle shallow and broad, inconspicuous. Fore wing with media twice-forked. Lateral tubercles not apparent. Body integument covered with powdery reticulations.

Ovipara. Color a little darker than in apterous summer vivipara. Measurements same as vivipara or slightly shorter in antennal segments. Hind tibia with proximal third slightly swollen and bearing scattered sensoria.

Male. Apterous. Color of body carneous or yellowish brown; head, entire antenna, cornicle, tarsi and tips of tibiae black or blackish., Body length 1.9; antenna 1.84.

Collections. On bark of *Symphoricarpos* sp., at or below surface of ground. Colorado: Fort Collins, Boulder and Ward. Utah: at Blacksmith Fork Canyon. Idaho: Castleford. Apterous summer viviparae May 2 to Aug. 9, alate viviparae May 10 to Aug. 9, sexuales Oct. 15 and 18, oviparae until Nov. 25; rather common.

Types. U.S.N.M., No. 41926. Paratypes, Colo. Agr. Exp. Sta. Collection.

Genus **Aphis** Linnaeus

Linnaeus, 1758:451; Buckton, 1879:31; Baker, 1920a:43.

Characters. Vertex slightly convex; frontal tubercles never exceeding vertex (except possibly in *rosea)* slightly produced on medial margin only. Antenna six-segmented, unguis filamentous; secondary sensoria subcircular usually with narrow rims. Cornicle cylindrical or slightly tapering. Cauda tapering to cylindrical, often constricted near the base, surface very denticulate. Hairs usually pointed (except in *asterensis, rociadae, rosea* and *solidaginifoliae* where they are blunt); on body and appendages rarely longer than diameter of segments bearing them; on cauda nearly as long as cauda and curved. Anal plate rounded. Wing venation normal; fore wing with media twice-branched. Rostrum four-segmented, with V fused with IV, indistinct (except in certain species on *Artemisia).* Lateral tubercles present at least on abdominal I and VII. Male often alate, ovipara apterous. Living on leaves, twigs and roots of deciduous trees and plants.

The genus *Aphis* is here used to also include species put under *Anuraphis* Del Guercio by many authors. The genus *Anuraphis* as conceived by said authors does not constitute a distinct genus since the only distinguishing character seems to be the short, tapering cauda. This character correlates with no other character and is itself unsatisfactory on account of numerous intergrading forms in the different species and even in different life cycle generations of the same species. Indeed certain generations of the genotype species of the genus *Aphis* possess a cauda which would place them in *Anuraphis.**

Genotype (by suspension of rules; set by Latreille, 1802), *Aphis sambuci* Linnaeus.

Key to Species of Aphis

1.	Rostrum with tip beyond hairs needlelike in ventral aspect resembling distinct V (Fig. 134) (p. 126)	2
....	Rostrum with tip beyond hairs not needlelike (Fig. 132)	9
2.	Cornicle reticulated distally (p. 246)	*Artemisaphis artemisicola*
....	Cornicle not reticulated	3
3.	Rostral IV+V at least .20 long	4
....	Rostral IV+V shorter than .20 long	5

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*See Theobald (1927:264), Hille Ris Lambers (1934:28, No. 36 and p. 30, No. 49).

4. Rostral IV+V .21-.24 long, barely attaining abdomen (p. 130).... *chrysothamnicola*
.... Rostral IV+V .24-.28 long, fully attaining abdomen (p. 145).... *infrequens*
5. Cornicle distinctly shorter than base of VI; entire dorsum covered with white reticulation (p. 153).... *minutissima*
.... Cornicle not distinctly shorter than base of VI; dorsum with broken pattern of white reticulation.... 6
6. Cornicle coequal with base of VI; III not longer than .14 (p. 136).... *filifoliae*
.... Cornicle longer than base of VI; III longer than .14.... 7
7. Unguis shorter than 1.5 times base of VI (p. 126).... *canae*
.... Unguis 1.5-2 times base of VI.... 8
8. Cornicle .10-.17 long in alata, .20-.27 in aptera; III .19-.25 long (p. 144).... *hermistonii*
.... Cornicle as above; III .30-.38 (p. 130).... *chrysothamni*
.... Cornicle .17-.24 long in alata, .27-.45 in aptera (p. 160).... *oregonensis*
9. Cornicle smooth, not imbricated.... 10
.... Cornicle imbricated.... 13
10. Rostral IV+V broad (less than 3 times as long as width at base); cauda acute (p. 177).... *solidaginifoliae*
.... Rostral IV+V slender (3 times as long as width at base); cauda obtuse.... 11
11. Anal plate with median projection; sensoria fewer than 10 on III of alata (p. 168).... *rociadae*
.... Anal plate without median projection; sensoria 10 or more on III of alata.... 12
12. Cauda broad, not longer than base of VI; without blunt hairs.... 12a
.... Cauda slender, longer than base of VI, bearing 1-2 blunt hairs at apex (p. 124).... *asterensis*
12a. Cornicle and rostral IV+V longer than 1.5 times length of base of VI (p. 127).... *cardui*
.... Cornicle and rostral IV+V shorter than 1.5 times length of base of VI (p. 142).. *helichrysi*
13. Hind tibia of viviparae not bearing sensoria.... 15
.... Hind tibia of all viviparae bearing sensoria, (except *A. viburnicola* fall migrants, in some cases, then base of VI ending abruptly) (Fig. 212).... 14
14. Sensoria located on proximal half of hind tibia; cornicle shorter than twice base of VI (p. 175).... *sensoriata*
.... Sensoria located on distal half of hind tibia; cornicle longer than twice base of VI (p. 184).... *viburnicola*
15. Rostrum broadly obtuse, IV+V shorter than twice width at base (Fig. 202).... 16
.... Rostrum slender, IV+V longer than twice width at base (Fig. 185).... 18
16. Cornicle slightly incrassate; imbrications denticulate (p. 217).... *Rhopalosiphum maidis*
.... Cornicle cylindrical, imbrications not evidently denticulate.... 17
17. Unguis 5-6 times as long as base of VI; cubitus of hind wing vestigial (p. 176).... *setariae*
.... Unguis 3-4 times as long as base of VI; cubitus of hind wing distinct (p. 128).... *cerasifoliae*
18. Cauda* not longer than broad.... 19
.... Cauda longer than broad.... 44
19. Cauda bearing at least 6 hairs on each side.... 20
.... Cauda bearing fewer than 6 hairs on each side.... 30
20. Sensoria circular to oval with wide rims; unguis distinctly longer than III. (p. 144).... *incognita*
.... Sensoria circular with narrow rims; unguis not longer than III.... 21
.... Sensoria circular with narrow rims; unguis longer than III. (p. 164).... *pilosicauda*
21. Cornicle shorter than V.... 22
.... Cornicle not shorter than V.... 23
22. III 1.5-2 times unguis; sensoria at least 20 on III in alata (p. 133).... *debilicornis*
.... III about same length as unguis; sensoria fewer than 10 on III in alata (p. 175).... *senecio-radicis*
23. III less than 3 times as long as base of VI; sensoria on III of alata fewer than 20.... 24
.... III 2-3 times as long as base of VI; sensoria 20-32 (p. 146).... *knowltoni*
.... III 3-4 times as long as base of VI; sensoria on III of alata 20 or more.... 29
24. Sensoria on III in alata fewer than 10, in aptera usually fewer than 8.... 25
.... Sensoria on III in alata 10 or more, in aptera 8 or more.... 28
25. III in aptera .17-.22 long, bearing 0-3 sensoria. Hind tibia of ovipara distinctly swollen throughout and covered with sensoria.... 26
.... III in aptera .23-.30 long, bearing 2-7 sensoria; hind tibia of ovipara swollen only on proximal third, bearing about 3 sensoria (p. 152).... *menthae-radicis*

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*Cauda length and width in key refers to length on median line of sclerotic or hard portion and width at base of this portion. (See Fig. 1.)

26. Unguis barely shorter than 1.5 times length of V. (p. 140)........*gutierreziae*
.... Unguis longer than 1.5 times length of V 27
27. Hind tibia length .70-.80. (p. 151)........*maidi-radicis*
.... Hind tibia length .60-.70. (p. 180)........*tetradymia*
28. Hairs reclinate, not numerous. (p. 123)........*armoraciae*
.... Hairs erect and numerous; cornicle 1-1.5 times rostral IV+V (p. 146)........*knowltoni*
.... Hairs as above; cornicle 2-4 times rostral IV+V (p. 174)........*sambucifoliae*
29. Hairs minute. (p. 129) ....*chipetae*
.... Hairs prominent. (p. 184) ....*viburnicola*
30. Cornicle shorter than 1.5 times base of VI 31
.... Cornicle at least 1.5 times as long as base of VI 38
31. Imbrications on cornicle plainly denticulate 32
.... Imbrications on cornicle not evidently denticulate 34
32. Rostral IV+V .10, not longer than cornicle, attaining 2d coxa. (p. 124)........*bakeri*
.... Rostral IV+V .12-.15 long, longer than cornicle, surpassing 2d coxa........33
33. Unguis not distinctly longer than IV. (p. 122) ....*argentinae-radicis*
.... Unguis 1.6 times to twice as long as IV; alata with dorsal black patch on abdomen. (p. 146) ....*kachena*
.... Unguis 1.5 times as long as IV; alata without dorsal black patch on abdomen. (p. 132) ....*crataegifoliae*
34. Cauda bearing 2-3 hairs on each side 87
.... Cauda bearing at least 4 hairs on each side 35
35. Antenna of alata with more than 20 sensoria on III. (p. 155)........*neilliae*
.... Antenna of alata with not more than 10 sensoria on III 36
36. Cornicle with flange. (p. 133)........*crypta*
.... Cornicle without flange 37
37. Color of body pink with dusky bands; unguis longer than cornicle. (p. 160)........*ornata*
.... Color of body green with dusky bands; unguis equalling cornicle. (p. 140)........*gregalis*
.... Color of body black with dark bands (evident after clearing); unguis hardly longer than cornicle. (p. 157) ....*nigra-gregalis*
38. Frontal tubercles slightly exceeding vertex; cornicle curved or slightly clavate........39
.... Frontal tubercles not exceeding vertex; cornicle straight 40
39. Hairs capitate. (p. 169) ....*rosea*
.... Hairs pointed. (p. 186) ....*vorabonnevilla*
40. Cornicle not longer than 1.5 times hind tarsal II 41
.... Cornicle longer than 1.5 times hind tarsal II 42
41. Sensoria on III of alata fewer than 10; unguis 1-1.3 times rostral IV+V. (p. 133) ....*crypta*
.... Sensoria on III of alata more than 10; unguis 2-3 times as long as rostral IV+V. (p. 181) ....*tulipae*
.... As above except unguis 1-1.5 times rostral IV+V. (p. 186)........*zonassa*
42. Cauda shorter than half of base of VI 48
.... Cauda at least half as long as base of VI 43
43. Cornicle shorter than unguis; body green with dusky markings. (p. 127)........*cardui*
.... Cornicle longer than unguis; body brown and black 88
44. Cauda tapering, ending in a point 45
.... Cauda not tapering, tip rounded 54
45. Cauda bearing 6 or more pairs of hairs 46
.... Cauda with fewer than 6 pairs of hairs; cauda not longer than base of VI........50
46. Cauda shorter than base of VI; cornicle longer than hind tarsus. (p. 132)........*coweni*
.... Cauda shorter than base of VI; cornicle shorter than hind tarsus. (p. 133)........*debilicornis*
.... Cauda longer than base of VI 47
47. Cornicle shorter than 3 times length of base of VI, same length as unguis. (p. 148)....*lupini*
.... Cornicle 3-4 times as long as base of VI, longer than unguis........49
48. Rostral IV+V hardly longer than hind tarsal II; body black. (p. 162)........*persicae-niger*
.... Rostral IV+V longer than 1.5 times hind tarsal II; body green. (p. 181)....*unaweepiensis*
49. Unguis shorter than 3 times base of VI. Body green or pink. (p. 172)........*saliceti*
.... Unguis at least 3 times base of VI. Body brown to black. (p. 150)........*maculatae*
50. Unguis same length as III 51
.... Unguis shorter than III 52
51. Cornicle shorter than 2 times hind tarsal II; sensoria on III in alata fewer than 10. (p. 147) ....*laciniariae*
.... Cornicle as long as 2 times hind tarsal II; sensoria in alata 8-10 or more on III........85

53. Cornicle 1-1.5 times base of VI; body green. (p. 125)........*bonnevillensis*
.... Cornicle shorter than base of VI; body grayish or green........77
.... Cornicle longer than 2 times base of VI; body brown. (p. 127)........*ceanothi*
54. Cauda about as long as 2 times base of VI in aptera (p. 149)........*lutescens*
.... Cauda never longer than 1.5 times base of VI........55
55. Cauda not bushy, bearing 2-4 pairs of lateral hairs........56
.... Cauda bushy, bearing 5 or more pairs of lateral hairs........70
.... Cauda bearing 4-5 pairs of lateral hairs........92
56. Unguis longer than III........57
.... Unguis not longer than III........60
57. Rostral IV+V longer than base of VI........58
.... Rostral IV+V not longer than base of VI........59
58. Alata with fewer than 6 sensoria on III; unguis shorter than 4 times base of VI. (p. 137)........*forbesi*
.... Alata with 9 or more sensoria on III; unguis as above. (p. 167)........*ribiensis*
.... Sensoria as above; unguis 4 times base of VI. (p. 169)........*roripae*
59. Cauda with slight neck. (p. 137)........*frangulae*
.... Cauda without slight neck. (p. 131)........*cornifoliae*
60. Cauda knoblike or wart-shaped distal to neck. (p. 129)........*cercocarpi*
.... Cauda approximately cylindrical distal to neck or base........61
61. IV longer than V........62
.... IV not noticeably longer than V........66
62. Sensoria 15-32 on III, 0-4 on IV of alata, always absent on IV in aptera. Not on Umbelliferae (p. 141)........*helianthi*
.... Same as above. On Umbelliferae (p. 143)........*heraclella*
.... Sensoria 25-39 on III, 12-20 on IV of alata, 0-17 on IV in aptera. (p. 158)........*nyctalis*
.... Sensoria not more than 20 on III, 0-4 on IV of alata; absent on IV in aptera........63
.... Sensoria not more than 20 on III, 4-7 on IV of alata; 0-13 on III, 0-4 on IV in aptera. (p. 165)........*pseudohederae*
63. Cornicle usually longer than 1.5 times hind tarsal II........64
.... Cornicle usually shorter than 1.5 times hind tarsal II........65
64. Sensoria 18-20 on III of alata; III longer than cornicle. (p. 132)........*coweni*
.... Sensoria fewer than 20 on III of alata; rostral IV .15 long; III not longer than cornicle in aptera. (p. 163)........*phaceliae*
.... As above except rostral IV+V .10 long. On *Rhamnus*. (p. 121)........*abbreviata*
.... As above. On *Monarda*. (p. 154)........*monardae*
65. Cornicle pale. On Cruciferae (p. 154)........*nasturtii*
.... Cornicle pale. On *Ribes* (p. 167)........*ribiensis*
.... Cornicle black. (p. 154)........*monardae*
66. IV of alata typically with sensoria........91
.... IV of alata typically without sensoria........67
67. Sensoria on III of alata 12 or more, not in straight line; hairs on hind tibia of aptera .06 long and nearly erect. (p. 155)........*neogillettei*
.... Sensoria on III of alata fewer than 12 and in a straight line; hairs on hind tibia of aptera shorter than .06, drooping........68
68. Body uniformly black, when cleared, showing dark dorsal bands. (p. 151)........*medicaginis*
.... Body not black, when cleared, not showing dark dorsal bands........69
69. Body pale yellow to green and blackish green; alatoid nymph tessellated. (p. 139)........*gossypii*
.... Body light green, without variation from pale to blackish; alatoid nymph not tessellated. (p. 159)........*oestlundi*
70. Unguis equal to III........71
.... Unguis usually distinctly shorter than III........78
71. Cauda but slightly longer than wide, rather wart-shaped distal to neck; several sensoria on IV of alata. (p. 174)........*sambucifoliae*
.... Cauda as above; sensoria 0-1 on IV. (p. 173)........*sambuci*
.... Cauda distinctly longer than wide, cylindrical to spoon-shaped distal to neck........72
72. Sensoria not more than 10 on III of alata........73
.... Sensoria more than 10 on III of alata........74
73. Hind tibia of ovipara distinctly swollen, covered with numerous sensoria. (p. 179)........*spiraecola*
.... Hind tibia of oviparae not swollen, bearing few sensoria. (p. 164)........*pomi*

52. Sensoria present on III, IV and V of aptera and alata (p. 161)....*pentstemonicola*
.... Sensoria absent on antenna of aptera and on IV and V of alata....53
74. Sensoria typically absent on V in alata....75
.... Sensoria typically present on V in alata....76
75. Body brownish green to black; rostrum not hairy. (p. 136)....*fabae*
.... Body light green, rostrum hairy. (p. 156)....*neomexicana*
.... As above except rostral IV+V .10-.12 (p. 167)....*ribi-gillettei*
76. Cornicle usually shorter than unguis; rostral IV+V .13-.15. On *Oenothera*. (p. 158)....*oenotherae*
.... Cornicle as above; rostral IV+V .11. On *Ribes*. (p. 167)....*ribigillettei*
.... Cornicle usually longer than unguis; rostral IV+V .14-.15. On *Ribes*. (p. 183)....*varians*
77. Unguis twice as long as cornicle; vertex in alata produced, cone-shaped. (p. 182)....*urovaneta*
.... Unguis same length as cornicle; vertex not produced. (p. 180)....*tetrapteralis*
78. Unguis not longer than 1-1.5 times base of VI. (p. 179)....*spiraephila*
.... Unguis 1.5-2 times base of VI....79
.... Unguis 2-3 times base of VI....84
79. Cornicle slightly narrowed in middle; unguis at least 1.5 times V; sensoria on III of alata fewer than 10, absent on IV. (p. 170)....*rubicola*
.... Cornicle not narrowed in middle....80
80. Unguis equal to 1.5 times length of V. (p. 158)....*nyctalis*
.... Unguis shorter than 1.5 times length of V....81
81. Sensoria on III of alata fewer than 20, absent on IV. (p. 172)....*rumicis*
.... Sensoria on III of alata at least 20, present on IV....82
82. Sensoria on III in alata usually more than 25, more than 12 on IV and more than 5 on V. (p. 155)....*neilliae*
.... Sensoria on III 30-36, on IV 0-1, on V 0. (p. 173)....*sambuci*
.... Sensoria on III in alata usually fewer than 25, on IV fewer than 12, on V fewer than 4....83
83. Unguis longer than IV; body length 1.6-2. (p. 138)....*fraserae*
.... Unguis equal to IV; body length 1.3-2.2. (p. 132)....*coweni*
.... Unguis shorter than IV; body length 2-2.9....89
84. Cauda about half as long as base of VI, hardly longer than broad. (p. 185)....*viburniphila*
.... Cauda two-thirds to as long as base of VI, nearly twice as long as broad....86
85. Cornicle slightly curved; imbrications denticulate. (p. 135)....*eriophori*
.... Cornicle not curved; imbrications smooth. (p. 127)....*ceanothi*
86. Cornicle 1.5-2 times base of VI; sensoria typically present on IV in alata and often in aptera. (p. 182)....*valerianae*
.... Cornicle 2-3 times base of VI; sensoria typically absent on IV in alata and never present in aptera....90
87. Antenna with unguis not shorter than .16. (p. 134)....*eriogoni*
.... Antenna with unguis shorter than .16. (p. 121)....*agathona*
88. Antenna with unguis longer than two-thirds of III; sensoria absent on antenna of aptera. (p. 127)....*ceanothi*
.... Antenna with unguis shorter than two-thirds of III; sensoria often present on III and IV in aptera. (p. 186)....*zonassa*
89. Body length 2 or more; body dark green. On *Senecio*. (p. 147)....*lugentis*
.... Body length less than 2; body black. On *Chrysothamnus*. (p. 186)....*zonassa*
90. Unguis longer than .30; tibial hairs .03. (p. 178)....*sorensoni*
.... Unguis not longer than .30; tibial hairs .01-.02. Not on Umbelliferae. (p. 141)....*helianthi*
.... Same as above. On Umbelliferae. (p. 148)....*heraclella*
91. Hairs on hind tibia .04-.05 long; hind tibia of ovipara hardly swollen, with few or no sensoria. (p. 166)....*pseudovalerianae*
.... Hairs on hind tibia .02-.03 long; hind tibia of ovipara much swollen, bearing numerous sensoria....93
92. Cornicle about the same length as half of unguis. (p. 171)....*rubifolii*
.... Cornicle shorter than half of the length of unguis. (p. 169)....*roripae*
93. Cornicle longer than 1.5 times rostral IV+V....94
.... Cornicle 1-1.5 times length of rostral IV+V. (p. 154)....*nasturtii*
94. Sensoria absent on III of aptera. On *Rhamnus* (p. 121)....*abbreviata*
.... Sensoria often present on III of aptera. On *Nepeta*. (p. 137)....*frangulae*

Aphis abbreviata (Patch)

The Buckthorn Aphid

Aphis abbreviata Patch, 1912a:170; Gillette and Palmer, 1932b:379.
Aphis rhamni Boyer de Fonscolombe (misidentification ?), Theobald, 1927:199 and 404.

Fundatrix. Body length 1.5; antenna .75, III and IV coalesced; hind tibia .63; otherwise as in summer vivipara except as figured.

Apterous Summer Vivipara. Pale green to yellowish; darker green on median line and lateral and posterior portions of abdomen; cauda and cornicle dusky; appendages pale or but slightly dusky; tarsi and tips of tibiae blackish. Same measurements as alate vivipara except body 1.50-1.80; and as figured.

Alate Vivipara. Color same as in apterous vivipara except dusky on lateral abdominal areas and appendages. Body length 1.30-1.50; hind tibia .75-.90; hind tarsal II .10; antenna 1.15-1.20. Rostrum obtuse, attaining between 2d and 3d coxae. Hairs short .01-.02 long, drooping and sparse on hind tibia and antenna. Cauda cylindrical, blunt, with slight neck and broader base, bearing 3-4 hairs on each side.

Ovipara. Apterous. Body length 1.10; antenna .75, III and IV coalesced; cornicle .10; rostral IV+V .08-.09. Otherwise as in apterous vivipara.

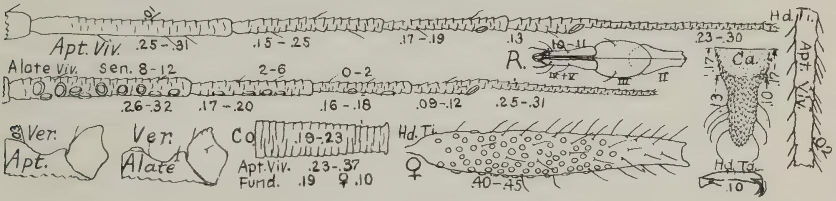

Fig. 127. *Aphis abbreviata*

Collections. On leaves and stems of *Rhamnus cathartica*, curling leaves. Colorado: Fort Collins. Fundatrices April 16, apterous summer viviparae April 30 to July 31, alate viviparae April 28 to Nov. 4, oviparae Nov. 2 to 4; rather common.

Cotypes. Me. Agr. Exp. Sta. Collection, No. 123-10.

Chief Distinguishing Characters. Pale yellowish green color, uniform in whole colony (not varying from very pale yellow to very dark green individuals as in *A. gossypii),* presence of secondary sensoria on IV (3-6) of alata, long cauda (.10-.14 on median line), long cornicle (about same as IV in alata and exceeding IV in aptera) and color of the cornicle (pale to dusky, not black).

This species differs from *A. rhamni* Boyer de Fonscolombe in the following characters as given in the original description of the latter, namely: A dark dorsal patch in alate vivipara and dorsal bands in apterous vivipara and cauda absent or appearing as a mere nipple.

Patch (1924:43) considers it to be the same as Theobald's *A. solanina* Passerini. Theobald (1922:10 and 1927:199) considers it the same as what he describes as *A. rhamni.* Hille Ris Lambers (1934:28) considers both of these *A. symphyti* Schrank. Schrank, however, in the original description says "cornicle very short." This very poorly fits our form. It seems best to use *abbreviata* at present though it may later be proven to be a synonym.

Aphis agathona Hottes

Aphis agathona Hottes, 1950:21.

Apterous Summer Vivipara. Brown with coxae, trochanters, femora, cornicle, cauda, anal plate, genital plate, tips of tibiae, antennal I, II, tips of IV, V and VI and of rostrum black. Body length 1.40-1.85; across eyes .34-.38; hind tibiae .60-.80; antenna 1-1.2; rostrum attaining about to 3d coxa. Cauda shorter than broad, tapering, bearing 2-3 pairs of lateral hairs and 1-2 dorsal preapical ones. Cornicle cylindrical to tapering, with flange. Hairs inconspicuous. Rostral IV+V slender and bearing sparse, short hairs. Hairs on body and antenna short and sparse; on hind tibia .02-.04 long.

Alate Vivipara. Head and thorax black; abdomen brown with slight dusky dashes. Body length 1.50-1.90; across eyes .34; hind tibia .70; antenna 1.2. Otherwise as in apterous vivipara.

Ovipara. Apterous. Same as apterous vivipara except hind tibia dark in color, considerably swollen and thickly covered with irregular-sized, mostly large, sensoria.

Male. Alate. Head and thorax black; abdomen brown, with lateral areas dark; antenna except base of III, cornicle, cauda, anal plate, rostrum, tarsi and tips of tibiae black. Body length 1.1; across eyes .35; hind tibia .60; antenna 1-1.50; otherwise same as alate vivipara except as shown in figure.

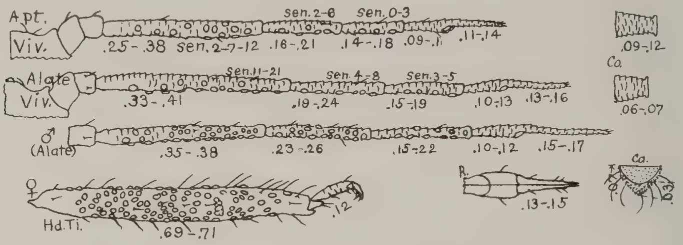

Fig. 128. *Aphis agathona*

Collections. On leaves of *Eriogonum inflatum* and *E. corymbosum* and sp. Colorado: Gateway, Fort Collins and Clifton. Apterous vivipara May 31 to Oct. 19, alate viviparae May 31 to July 21, sexuales Oct. 19.

Type. U.S.N.M. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Brown body, short unguis (shorter than .17), short cauda (shorter than broad) and length of rostral IV+V (.13-.15) and its slender shape.

Aphis argentinae-radicis Gillette and Palmer

Aphis argentinae-radicis Gillette and Palmer, 1932a:140 and 1932b:380.

Apterous Summer Vivipara. Nymph. Pale, dusky only on head and tips of appendage segments. *Adult.* Pale greenish with mottling of darker green; head, terminal abdominal segments and speckles over dorsum dusky; cornicle, anal plate, cauda and entire legs blackish. Body length 1.40-1.70; hind tibia .90; hind tarsal II .12; antenna .75-1.05, sensoria circular with rather broad rims, strongly convex and set on tubercles; rostrum obtuse, slender attaining abdomen. Hairs fine, pointed, erect, numerous, .04-.05 on body. Dorsal surface finely denticulate but not showing reticulate pattern. Cornicle tapering, 1.5 times as wide at base as at tip, imbrications finely denticulate, flange rather large. Lateral tubercles present.

Ovipara. Apterous. Body length 1.50; hind tibia .63; antenna .68; hind tibia bearing about 2 sensoria near middle, not noticeably swollen. Otherwise as in apterous vivipara.

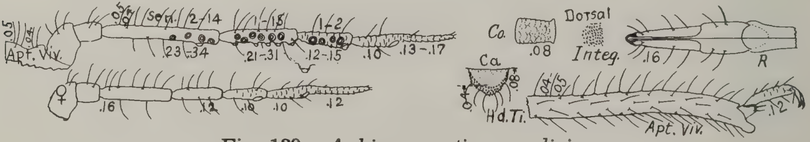

Fig. 129. *Aphis argentinae-radicis*

Collections. On roots of *Potentilla anserina.* Colorado: Pingree Park. Apterous summer viviparae and one apterous ovipara Aug. 23; rare.

Types. U.S.N.M., No. 43844. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Prominent erect hairs, denticulate sculpture of cornicle, very short cauda bearing not more than 3 pairs of hairs and the slender hind tibia of the ovipara bearing only about 2 noticeable sensoria.

Aphis armoraciae Cowen

The Western Aster Root Aphid

Aphis armoraciae Cowen (in Gillette and Baker), 1895:117.
Aphis middletonii Thomas (misidentification), Gillette and Palmer, 1932b:418.

Apterous Summer Vivipara. Green, yellowish to dusky olive; with powdery reticulations; dusky on dorsum of head, pronotum, lateral areas of all segments anterior to cornicle and bands on all segments, the latter frequently more or less broken or lacking on abdomen anterior to cornicle; appendages brownish or dusky except middle of tibiae; cornicle and cauda dusky. Body length 1.5-2.5; hind tibia .60-.95; antenna .80-1.1; rostrum hardly attaining 3d coxa.

Alate Vivipara. Color as in aptera but dorsal bands more broken or lacking. Body length 1.9-2; hind tibia .8-1; antenna 1, secondary sensoria slightly tuberculate. Hairs pointed, inconspicuous, shorter than diameter of antenna or hind tibia, drooping and sparse. Cornicle with weak flange. Cauda bearing 5-7 hairs on each side. Lateral tubercles quite large on prothorax and abdominal I and VII, inconspicuous or absent on other segments.

Ovipara. Apterous. Color same as in apterous vivipara or darker with hind tibia dusky and swollen along entire length and bearing numerous slightly convex sensoria. Body length 2; antenna .90, III .23, with 3-5 sensoria, IV .13 with 2 sensoria, V .14, VI .12+.16-.20.

Male. Alate. Color similar to alate vivipara or darker; somewhat smaller.

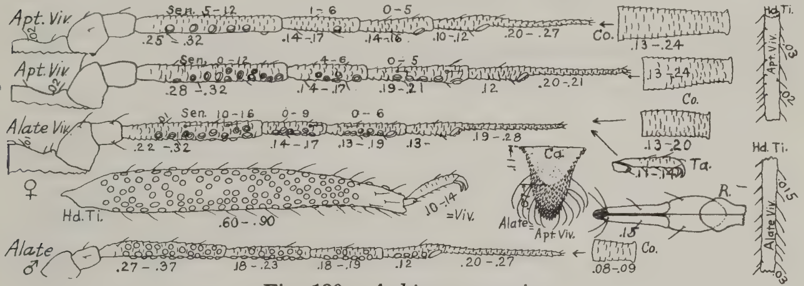

Fig. 130. *Aphis armoraciae*

Collections. On roots of *Asclepias stenophylla, Ambrosia trifida,* horseradish *(Armoracia lapathifolia), Artemisia frigida, Aster ericoides, Capsella bursa-pastoris,* Chicory *(Chicorium* sp.), *Descurainia* sp., *Erigeron canadensis, Helianthus pumilus* and sp., parsnip *(Pastinaca sativa),* dock *(Rumex acetosella)* and *R.* sp., dandelion *(Taraxacum officinale), Senecio* sp., salsify *(Trapogon pratensis)* and corn *(Zea mays).* Throughout region. Apterous summer viviparae May 8 to Oct. 8, alate viviparae May 27 to Oct. 8, oviparae Sept. 27 to Nov. 6, males Sept. 27 to Oct. 7; very common.

Type. Lost. Neotype (selected by the author), U.S.N.M.

Chief Distinguishing Characters. Pale green to olive-green body with more or less of broken dorsal bands in aptera, short bushy cauda, usual presence of sensoria on the antenna of the aptera, short cornicle (not longer than unguis) and male alate, and as compared with *A. maidi-radicis:* Longer antenna (III not shorter than .22), more numerous sensoria (usually 10-16, not less than 8 on III in alata) and male alate (apterous in *A. maidi-radicis).* The host plant habits also indicate separate identity, namely: Almost complete absence of corn root trouble from this aphid west of the 102d meridian in spite of the abundance of said aphid on other plants, and lack of collections on cucurbits and grasses which hosts are reported as readily infested by *Aphis maidi-radicis.*

The species here treated was formerly determined as *A. middletonii* Thomas but the determination is here changed on account of the probable identity of *middletonii* with *maidi-radicis.* This status is indicated by description by Oestlund (1887:54) and by the decisions of Hottes and Frison (1931a:203) as well as examination of specimens sent by the latter, collected in central and eastern states. The original description of *middletonii* is not sufficiently complete for exact determination and the type specimens seem to be lost.

Aphis asterensis Gillette and Palmer

The Little Black-veined Aster Aphid

Aphis asterensis Gillette and Palmer, 1929a:22 and 1932b:382.

Apterous Summer Vivipara. Pale greenish yellow somewhat mottled; appendages and cornicle pale with dusky tips. Body length 1.3; hind tibia .60; hind tarsal II .09; antenna .75; rostrum obtuse, attaining between 2d and 3d coxae.

Alate Vivipara. Head and thorax yellowish brown; abdomen light yellow mottled with pale green; antenna dusky to black; wing veins heavy and black; appendages as in apterous vivipara. Body length 1.4; hind tibia .70; antenna 1.1. Cauda parallel-sided distally. Cornicle smooth, with encircling depression next to flange. Hairs on body and appendages capitate, very short and sparse on antenna; one or two heavy capitate hairs near tip of cauda.

Ovipara. Apterous. Same as apterous vivipara except hind tibia hardly swollen, bearing 8-16 large sensoria.

Male. Alate. Body length .90; hind tibia .55; antenna .83.

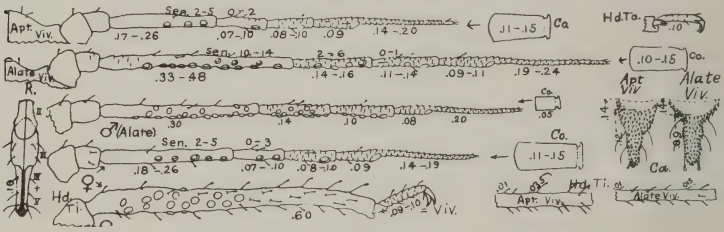

Fig. 131. *Aphis asterensis*

Collections. On leaves and stems of *Aster ericoides.* Colorado: Fort Collins. Apterous summer viviparae May 8 to Oct. 5, alate viviparae May 8 to May 29, sexuales Oct. 5; rather rare.

Types. U.S.N.M., No. 41464. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Peculiar shape of the cauda, with capitate hairs near tip, smooth cornicle with encircling groove at base of flange and large sensoria on hind tibia of ovipara.

Aphis bakeri Cowen

The Short-beaked Clover Aphid (Plate VI)

Aphis bakeri Cowen (in Gillette and Baker) 1895:118 (line 20); Davis, 1908a:259; Gillette, 1908d:364 and 1915a:101 and 1918b:333; Smith (R.H.), 1923:1; Gillette and Palmer, 1932b:383; Hottes, 1949c:160 (proposed synonymy).*

Aphis cephalicola Cowen (in Gillette and Baker), 1895:118 (line 37).

Fundatrix. Nymph. Newly hatched, dark green or appearing black, soon streaked and mottled with deep red, appearing pink to naked eye; cornicle and cauda very short and pale yellowish green; appendages pale green. *Adult.* Yellowish green, usually mottled with salmon-pink to deep red, some individuals entirely deep dark red posterior to head. Body 2.25 by 1.60; antenna .60-.66, III, IV and V fused; hind tibia .80.

Apterous Summer Vivipara. Dull yellowish green to pinkish; mottled with dark green or rusty-brown specks; without dusky markings except on tip of abdomen, head, and areas surrounding bases of hairs; the latter being quite often conspicuous, especially in nymphs. Cornicle pale yellow and surrounded at base with pale orange blotch; appendages pale, with tarsi, tips of tibiae and of antenna black. Body length 1.7-2.2; hind tibia .80; hind tarsal II .10; antenna .90-1.1; rostrum obtuse, slightly surpassing 2d coxa.

Alate Vivipara. Head and thorax black; abdomen dull yellow-green to brownish; with dusky lateral areas and dorsal bands, which coalesce to form a dark patch. Body length

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*Hottes considers *bakeri* Cowen a synonym of *trifolii* Oestlund. The evidence appears to the writer to be inconclusive. The case is well stated by Gillette (1908d:364, footnote).

1.75-2; hind tibia .90; hind tarsal II .10; antenna 1.12-1.4, secondary sensoria circular, tuberculate; rostrum obtuse, hardly attaining 2d coxa. Hairs pointed, sparse, drooping and short. Cornicle cylindrical or slightly tapering, with denticulate imbrications and distinct flange. Cauda bearing 3-4 hairs on each side. Lateral tubercles present. *Alatoid Nymph.* Body pale yellowish, marked on the abdomen with deep salmon, leaving pale orange blotch about the base of the cornicle; dusky specks entirely absent; wing pads brownish yellow.

Ovipara. Apterous. *Immature.* Light green to pinkish with dusky head and cornicle and with 6 longitudinal rows of dark specks posterior to pronotum. *Mature.* Red anteriorly, yellow tinged with pink posteriorly, with numerous dusky spots, abdomen mottled with eggs showing through. Appendages pale, with tarsi and tip of antenna blackish. Body length 1.35; antenna five- or six-segmented, .51.

Male. Alate. Color and measurements same as in alate vivipara.

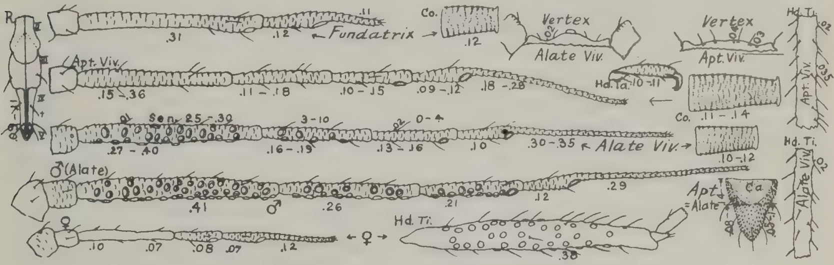

Fig. 132. *Aphis bakeri*

Collections. On tips of twigs, leaves and blossom buds of hawthorn (*Crataegus* sp.), quince (*Cydonia* sp.), apple (*Malus* sp.) and pear (*Pyrus communis*) as winter hosts; on alfalfa (*Medicago sativa*), sweet clover (*Melilotus* sp.) and red and white clover (*Trifolium* sp.) as summer hosts. Throughout region. Fundatrices on winter hosts Mar. 19 to June 11, apterous viviparae on winter hosts May 8 to July 8, on summer hosts Mar. 22 to Dec. 23; alate viviparae, spring migrants, on winter hosts April 24 to June 8, stragglers throughout summer, return migrants Sept. 3 to Dec. 18, on summer hosts March 22 to Dec. 13 or all winter in the case of individuals hibernating in viviparous form; sexuales on the winter hosts Sept. 26 to Dec. 9; eggs Nov. 1; very common; often causing serious damage on the clover grown for seed where it gums up the seed heads with honeydew and glues the seeds together in cakes in storage. The entire seed crop may thus become a total loss.

Type. Lost. Neotype (selected by author), U.S.N.M.

Chief Distinguishing Characters. Short cornicle with denticulate imbrications, short rostrum hardly surpassing 2d coxa (IV+V .10 long), black dorsal patch on abdomen of alate vivipara and usual absence of secondary sensoria on V of alate vivipara.

Aphis bonnevillensis Knowlton

Aphis bonnevillensis Knowlton, 1928a:262 and 1928c:62; Gillette and Palmer, 1932b: 384.

Alate Vivipara. Blue-green to yellow-green; appendages including cornicle pale. Body length "1.12"-1.33; antenna .80; hind tibia .90; hind tarsal II .11-.13.

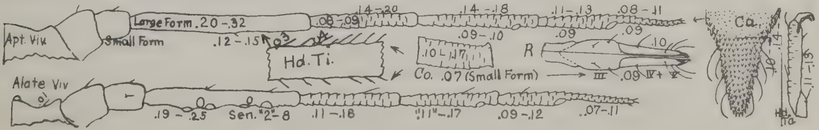

Fig. 133. *Aphis bonnevillensis*

Apterous Summer Vivipara. Large Form. Body length 1.45; antenna .85; hind tibia .83; hind tarsal II .11-.14; rostrum obtuse, slender, attaining 3d coxa. Hairs on vertex and antenna fine, pointed, sparse, .01 long; on hind tibia sparse, .015-.02 long. Cauda tapering bearing 4 hairs on each side. Lateral tubercles evident only on prothorax. *Small Form.* Body length 1.3; hind tibia .50; hind tarsal II .10; antenna .53-.60; cauda .10 on median line, bearing 2-3 hairs on each side.

Collections. On leaves and twigs of *Sarcobatus vermiculatus.* Colorado: Manzanola and Grand Junction. Idaho: Delco and Parma. Utah: Throughout northern part of state. Alate viviparae May 18 and in Sept., apterous viviparae May 15 to Nov. 10, dwarf apterous viviparae at Grand Junction June 24 and Parma July 23; probably not rare but little collecting has been done in localities where the host occurs.

Cotypes. Knowlton, Utah Agr. Exp. Sta. and Colo. Agr. Exp. Sta. Collections.

Chief Distinguishing Characters. Pale blue-green body without markings, fact that rostral IV+V, cauda, unguis and base of VI are about the same length and cornicle variation, from the same length as the latter parts to 1.5 times their length.

Aphis canae Williams

Aphis canae Williams, 1910:39; Davis, 1911b:11; Gillette and Palmer, 1932b:385.
Anuraphis canae, Gillette and Palmer, 1928:10.

Apterous Summer Vivipara. Green with darker mottling, with whitish band on abdominal I and lighter color around margins of body; head darker; cornicle black; legs pale. Body length 1.60; antenna .71-.93; hind tibia .50-.60; hind tarsal II .10; rostrum acute, tip beyond hairs compressed laterally, needlelike in ventral view, .06 long, resembling distinct segment V, attaining abdominal I.

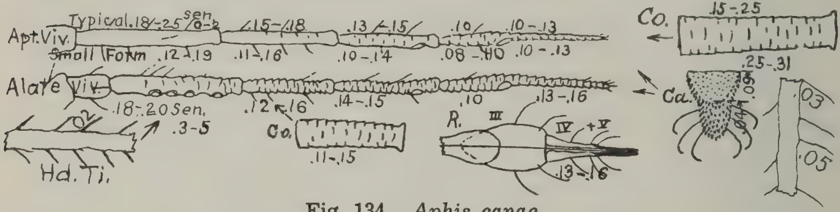

Fig. 134. *Aphis canae*

Alate Vivipara. Color as in apterous vivipara. Body length 1.24; antenna .82-.92, secondary sensoria large, in single row, on III. Cauda tapering, with rounded tip, bearing 3 curved hairs on each side. Lateral tubercles developed on prothorax and abdominal I and VII.

Collections. On leaves and stems of *Artemisia cana, A. filifolia, A. tridentata* and *A. longifolia.* Throughout region. Apterous summer viviparae May 17 to Aug. 8, alate viviparae May 17 to July 15; not abundant.

Cotypes. U.S.N.M., No. 60 and Univ. of Neb. Collection, No. 54.

This group containing *A. canae, A. filifoliae, A. hermistonii* and *A. oregonensis,* presents a very puzzling series of gradations. No structural differences, other than size and proportions of antennal segments and cornicles, were detected; and no distinct line can be drawn between any of the forms. Neither is any definite aid to be gotten from the host species as each form has been taken on several species of *Artemisia.* On the other hand the limits of variation represented by the extreme forms make it seem rather improbable that only one species is concerned. This is supported by the fact that with but a few exceptions, the individuals of a single collection all fall in the same group. Since the several species names have been established it seems most advisable to the author to hold them distinct until further study proves otherwise.

Aphis cardui Linnaeus

The Thistle Aphid

Aphis cardui Linnaeus, 1758:452; Kaltenbach, 1843:115; Baker, 1920b:17; Smith (R.H.), 1924 (circ.); Gillette and Palmer, 1932b:387.
Brachycaudus cardui, van der Goot, 1915:254.
Anuraphis cardui, Theobald, 1927:233.

Apterous Summer Vivipara. Green or yellowish with large dorsal patch and bands, sometimes entire dorsum black; legs yellowish with tarsi and tips of tibiae black; antenna yellowish with tips of segments dusky; cornicle black. Body length 2-2.3; hind tibia 1; antenna 1.40-1.75.

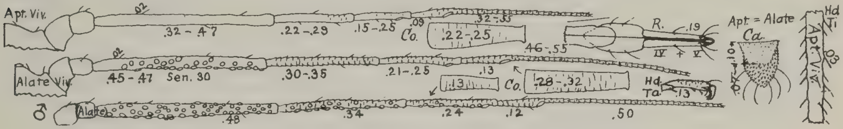

Fig. 135. *Aphis cardui*

Alate Vivipara. Color same as in apterous vivipara except antenna dark. Body length 2; hind tibia 1-1.20; hind tarsal II .13; antenna 1.7-1.9, secondary sensoria round, flat; rostrum attaining 3d coxa. Cornicle cylindrical to tapering, very faintly imbricated, nearly smooth, with slight flange. Cauda tapering, broader than long, bearing 3 hairs on each side. Hairs fine, pointed, very sparse and short; on antenna .02, hardly as long as half of diameter of III; on hind tibia .04 long, length equalling diameter of tibia; on body .02; on vertex .03. Lateral tubercles present on prothorax and abdominal segments.

Male. Alate. Body length 1.5; cornicle .15; otherwise as in alate vivipara except as figured.

Collections. On leaves and stems of plum (*Prunus* sp.) as winter host; thistle (*Cirsium lanceolatum*) as summer host. Colorado: Bellvue, Fort Collins, Grand Mesa, Virginia Dale (near Livermore) and Battle Creek. Idaho: Napa and Twin Falls. Utah: Generally distributed. Apterous summer viviparae June 1 to Aug. 28 on *Cirsium*, alate viviparae June 13 to 23 on thistle, Aug. 15 and Sept. 17 to Oct. 15 on plum, alate males Oct. 27; rare, especially on eastern slope of Rocky Mountains.

Chief Distinguishing Characters. Short cauda, long cornicle (.22-.28 or .32, twice as long as hind tarsal II), extraordinarily long rostral IV+V (.18-.20) and black body of alate vivipara due to bands and dorsal patch.

Aphis ceanothi Clarke

The Ceanothus Aphid

Aphis ceanothi Clarke, 1903:250; Essig, 1917:338 (synonymy); Gillette and Palmer, 1932b:388.
Aphis ceanothi-hirsuti Essig, 1911c:525; Gillette and Palmer, 1932b:389.

Apterous Summer Vivipara. Large Form. Reddish brown, marked with black posterior to cornicles; legs mostly pale; antenna dusky except paler on proximal portion of III; cauda and cornicle black. Body length 1.8-2; hind tibia .9; antenna 1.3; rostrum obtuse, IV+V .11 long, attaining 3d coxa. Cornicle in some views slightly curved outwards. Cauda about as long as broad, bearing 3-4 hairs on each side. Lateral tubercles conspicuous on prothorax and abdominal I, not evident on other segments. *Small Form.* Body length 1-1.40; width .90; hind tibia .50-.70; hind tarsal II .11; antenna 1-1.1. Dorsal surface of body somewhat reticulated.

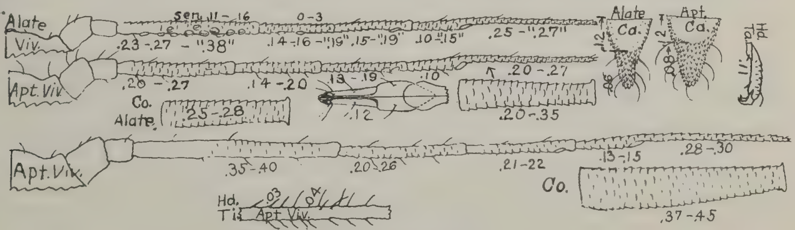

Fig. 136. *Aphis ceanothi*

Alate Vivipara. Body length 1.2-1.5; hind tibia .70; hind tarsal II .11; antenna 1.1, sensoria convex, with narrow margins, arranged in double row on III; rostrum obtuse, attaining abdomen. Lateral tubercles quite large on prothorax, abdominal I and VII and, in some examples, evident on all abdominal segments.

Collections. On flower stems and leaves of *Ceanothus* sp. Colorado: Boulder and Pingree Park. Apterous viviparae (small form) July 11 to Sept. 2, (large) Aug. 25, alate viviparae July 11; rather rare.

This small form differs slightly from the original description in the length of III (not attaining .31) and the width of the aptera (not attaining 1.19). Essig, after examining both forms of Colorado specimens which were sent him, states in correspondence that they check very well with the California specimens, which he considers to belong to Clarke's species. This gives the species a very wide range of variation.

Cotypes. Essig Collection. Cotypes of *ceanothi-hirsuti,* Essig and Colo. Agr. Exp. Sta. Collections.

Chief Distinguishing Characters. Reddish or amber-brown body with black markings on posterior abdominal segments, length of cornicle (ranging about the same or slightly longer than III), length of rostral IV+V (about the same as that of hind tarsal II, tapering shape of the cauda which is hardly longer than broad and shorter on median line than hind tarsal II, number of caudal hairs (3-4 lateral pairs) and number of sensoria on III of alate vivipara (11-16), in small form. No alatae of larger form were taken but sensoria in specimens this size ranged from 19-23 as described by Essig (1911c:525).

Aphis cerasifoliae Fitch

The Chokecherry Aphid

Aphis cerasifoliae Fitch, 1855:131; Thomas, 1879:93; Patch, 1914a:260; Swain, 1919:97; Gillette and Palmer, 1932b:389.

Fundatrix. Color same as summer aptera but lacking the pulverulence. Body length 2.25-2.90; antenna .90-1, five-segmented (III and IV fused).

Apterous Summer Vivipara. Pale yellowish to light green, with darker green markings on intersegmental lines and on median line anterior to cornicles; dorsum lightly covered with powder in transverse bars; venter heavily powdered; tibiae pale with tips blackish; antenna dusky distally; cornicle pale except tip, cauda pale. Body 2.5 by 1.4; hind tibia 1.1-1.2; antenna 1.66; rostrum broad, attaining 2d coxa.

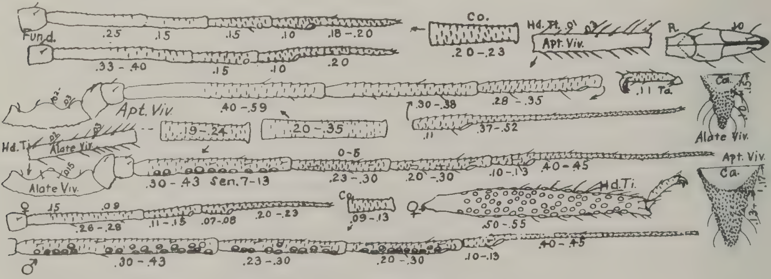

Fig. 137. *Aphis cerasifoliae*

Alate Vivipara. Color as in apterous vivipara except head and thorax which are brownish black and cornicle and antenna, beyond base of III, which are dusky. Body length 2-2.5; hind tibia .90-1; antenna 1.35-1.70; rostrum attaining between 2d and 3d coxae. Hairs pointed, inconspicuous, sparse; on hind tibia very drooping. Cauda bearing 2-3 hairs on each side. Lateral tubercles evident on prothorax and all abdominal segments. Fore wing with 2d fork of media unusually short, about one-quarter of the distance from margin of wing to 1st fork.

Ovipara. Apterous. Light yellow mottled with green; head, antenna beyond base of III, tarsi, tips of 1st and 2d tibia, entire hind tibia and tip of cornicle dusky. Body elongated in shape, 1.80 long; antenna .80; hind tibia strongly swollen on nearly entire length and thickly covered with large, flat sensoria.

Male. Alate. Body length 1.25; cornicle .15; other measurements as in alate vivipara.

Collections. On leaves and twigs of *Prunus virginiana*, badly curling leaves. Throughout region. Fundatrices April 18 to 22, apterous viviparae May 13 to Aug. 18, alate viviparae May 26 to Sept. 18, oviparae Sept. 30 and Nov. 2, males Oct. 15 to Nov. 1; very common.

Cotypes. U.S.N.M.

Chief Distinguishing Characters. Short 2d fork of the media of fore wing and broad rostral IV+V (width at base greater than half of length).

Aphis cercocarpi Gillette and Palmer

Aphis cercocarpi Gillette and Palmer, 1929a:17 and 1932b:391.

Apterous Summer Vivipara. Greenish black; shining; antenna and legs pale with tips of segments dusky; cornicle and cauda blackish. Body length 1.3; hind tibia .60-.70; hind tarsal II .10; antenna .95; rostrum obtuse, slender attaining 3d coxa.

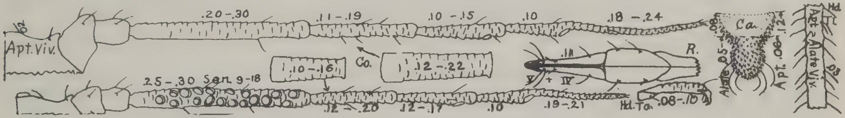

Fig. 138. *Aphis cercocarpi*

Alate Vivipara. Head and thorax black; abdomen blackish green; tibiae pale with tips blackish; antenna pale proximally, dusky on tip of III, IV and entire V and VI; cornicle and cauda dusky. Body length 1.33; hind tibia .67; antenna .85, secondary sensoria large. Hairs pointed, inconspicuous, drooping and sparse, .02-.03 long on vertex, antenna and hind tibia. Lateral tubercles hardly evident on prothorax and abdominal I and VII.

Collections. On leaves and twigs of *Cercocarpus montanus.* Colorado: Loveland, Stove Prairie (above Bellvue), Palisade and Ingleside. Apterous viviparae Aug. 15 to 21, alate viviparae Aug. 21; rare.

Type. U.S.N.M., No. 41461. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. The short rather wartlike cauda.

Aphis chipetae Hottes

Aphis chipetae Hottes, 1933:6; Palmer, 1936b:735.

Apterous Summer Vivipara. Head and thorax slightly dusky; abdomen yellow-green mottled with brownish; cauda brown; cornicle and antenna pale proximally, dusky distally.

Alate Vivipara. Head and thorax blackish brown; abdomen light green with dusky lateral areas, dorsum marked with specks anterior to cornicles, with bands posterior to cornicles, with pale areas surrounding bases of cornicles; antenna, cornicle, cauda and legs dark; wing veins bordered with brownish. Body length 2; hind tibia .80-1; rostrum attaining abdomen; lateral tubercles large and shallow; cornicle and body surface smooth. Hairs inconspicuous, .02 long and rather sparse. Cauda rather acutely tapering, bearing about 6 pairs of hairs. Cornicle cylindrical, with flange and imbricated.

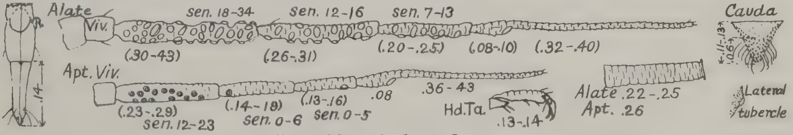

Fig. 139. *Aphis chipetae*

Collections. In crowns of *Castilleia* sp. Colorado: Skyway (near Cameo). Alate and apterous summer viviparae July 12.

Type. U.S.N.M.

Chief Distinguishing Characters. Smooth body surface, broad, shallow lateral tubercles, many hairs on the cauda (6 pairs), numerous tuberculate sensoria on III of alate vivipara and length of rostal IV+V (not shorter than .13 and attaining 3d coxa).

Aphis chrysothamni Wilson

Aphis chrysothamni **Wilson, 1915a:101.**

Apterous Summer Vivipara. **Head wine color, lighter on thorax; abdomen light green to pinkish, mottled and with dorsal dark spot; tip of abdomen pulverulent; cauda and cornicle dark. Body length 1.7-2-"2.35"; across eyes .44; hind tibia .65-.80; hind tarsal II .11; rostrum acute, attaining to abdomen.** ***Young.*** **Body green.**

Alate Vivipara. **Head and thorax black, abdomen light green mottled with darker green; antenna, cauda and cornicle dark; tibiae somewhat dusky. Body length 1.55; across eyes .41; antenna about 1.25 long; hind tibia .68-.75; hind tarsal II .12; rostrum acute, tip needlelike in ventral aspect, attaining or surpassing 3d coxa.**

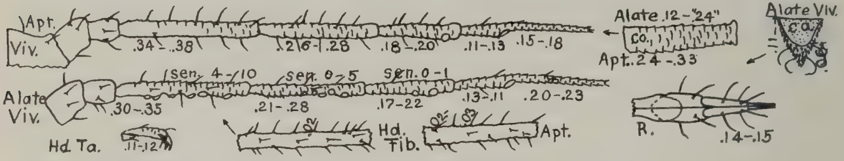

Fig. 140. *Aphis chrysothamni*

Collections. On *Chrysothamnus nauseosus* subsp. *nauseosus.* Utah: Brigham, Collinston, Parowan, Hooper, Trenton, Amalga, Honeyville, Smithfield and Gusher. Idaho: Malad. Alate and apterous viviparae June 9 to Aug. 16; fairly common.

Type. Either U.S.N.M. or Granovsky Collection. Paratypes, Colo. Agr. Exp. Sta. Collection.

On July 31 and August 16, near Honeyville and at Fisher Pass, Utah, apterous viviparae were taken which closely resemble the cotypes except for exhibiting smaller size in all parts except rostrum and unguis, with measurements as follows: Body 1-1.5; III .20-.25, IV .15-.21, V .14-.16, VI .11-.13+.14-.20; cornicle .12-.22. On June 8, near Brigham, Utah, alate and apterous viviparae were taken, the alatae being quite typical but the apterae exhibiting relatively short measurements agreeing with the above mentioned atypical collection excepting III which is nearly typical in length (.28-.30). It appears likely that these two collections represent variations of *A. chrysothamni* but further investigation is needed.

Chief Distinguishing Characters. Acute needlelike but not unusually long rostral IV+V (.14), acute and short cauda bearing but 2 pairs of lateral hairs set at approximate right angles to the cauda and strongly curved.

Aphis chrysothamnicola Gillette and Palmer

Anuraphis chrysothamnicola **Gillette and Palmer, 1929:5 and 1932b:391.**
Aphis chrysothamnicola, **Gillette and Palmer, 1932b:391; Knowlton and Smith, 1936g: 778.**

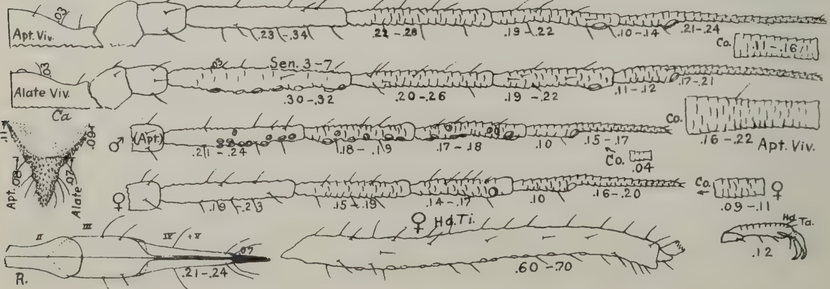

Fig. 141. *Aphis chrysothamnicola*

Apterous Summer Vivipara. Head blackish; body dusky ochre-red or dull blackish green with dark bands on abdominal VII and VIII; antenna beyond middle of V, tarsi, tips of tibiae, rostral III, IV and V, cornicle, cauda, anal and genital plates dusky to black. Body 2 by 1.3; hind tibia .85-1; antenna 1.26; rostrum acute, tapering, tip beyond hairs compressed laterally, having appearance of distinct segment V, appearing needlelike in ventral aspect, attaining abdominal II or III. *Young.* Pale greenish yellow with reddish tinge and dusky head.

Alate Vivipara. Head and thorax black; abdomen dull blackish green, darkest on median and segmental lines and with black bands on dorsum of abdominal VII and VIII; cornicle, cauda, anal and genital plates, antennal I, II and VII and tips of III, IV and V and rostrum beyond II dusky to black. Same in measurements as apterous vivipara or with slightly shorter cornicle. Cornicle without evident flange, occasionally bearing a hair on distal half. Cauda bearing 3-5 hairs on each side and 1-2 dorsally. Lateral tubercles large, present on prothorax and abdominal I, II and VII.

Ovipara. Apterous. Color same as apterous vivipara. Body length 2; antenna 1. Hind tibia very slightly swollen along entire length and bearing about 12 inconspicuous sensoria along the posterior margin.

Male. Apterous. Color same as ovipara. Body length 1.25-1.50; hind tibia .70; antenna 1.

Collections. On leaves and twigs of *Chrysothamnus nauseosus* subspp. *graveolens* and *nauseosus.* Colorado: Fort Collins, Bellvue, Pueblo, Eagle, Cameron Pass and Meeker. Utah: Numerous localities throughout the state. Idaho: Hollister. Apterous summer viviparae May 30 to Sept. 24, alate viviparae May 31 to July 10, sexuales Oct. 7 to 29; rather common.

Type. U.S.N.M., No. 41455. Paratypes, Colo. Agr. Exp. Sta. and Knowlton or Utah Agr. Exp. Sta. Collections.

Chief Distinguishing Characters. Long and acute, needlelike rostral IV+V, acute, tapering cauda, peculiar shape of cornicle (slightly narrowed in the middle and without flange) and sensoriation of the hind tibia of ovipara.

Aphis cornifoliae Fitch

The Dogwood Aphid

Aphis cornifoliae Fitch, 1851:65; Monell, 1879:25; Davis 1910d:484; Hottes and Frison, 1931a:189; Gillette and Palmer, 1932b:393.

Apterous Summer Vivipara. Greenish black, with black bands on abdominal VII and VIII; appendages pale to dusky with black on tarsi and tips of tibiae and dusky on antennal V and VI; rostrum, cornicle, cauda, anal and genital plates dusky to black. Body .90-1.20; hind tibia .60; antenna .90-1.05. Cauda slightly longer than wide; rostrum obtuse, attaining 3d coxa. Hairs pointed and drooping. Cauda tapering, bearing about 4 hairs on each side. Lateral tubercles well developed on prothorax and abdominal I and VII.

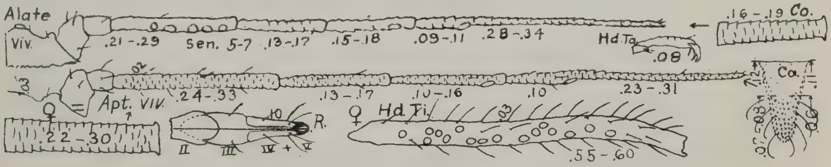

Fig. 142. *Aphis cornifoliae*

Alate Vivipara. Measurements as in aptera except as figured.

Ovipara. Apterous. Dark greenish black. Body length 1.30; antenna .95; cornicle .21. Hind tibia hardly swollen but bearing scattered large flat sensoria. Otherwise as in apterous vivipara.

Male. Apterous. Color same as in ovipara. Body length 1.20; hind tibia .70; cornicle .20.

*Collections.** On leaves and stems of *Cornus stolonifera.* Colorado: Fort Collins and Bellvue. Utah: Ogden Canyon. Idaho: Kimberly. Alate viviparae Sept. 10, apterous viviparae May 20 to Oct. 8; sexuales Oct. 8; rare.

Cotypes. U.S.N.M.

*Record by Gillette (1910:405 on *Ribes aureum*) is erroneous, the aphid being *Aphis helianthi* Monell.

Aphis coweni Palmer

Aphis veratri **Cowen (in Gillette and Baker), 1895:122 *veratri* (preoccupied); Palmer, 1936b:739 *veratri* Cowen.**
Aphis coweni **Palmer, 1938:352 (new name for *veratri* Cowen).**

Apterous Summer Vivipara. **Lead-gray to greenish black; dorsum reticulated; appendages pale except tips; tarsi, cauda, cornicle, anal and genital plates black, rostrum dusky. Body length 1.40-2; across eyes .39; antenna 1.20-1.40; hind tibia .80-.90; rostrum attaining nearly or quite to 3d coxa. Cornicle cylindrical or somewhat broadened at base, cauda bluntly tapering to spatulate, bearing 4-6 hairs on a side. Hairs pointed on side of abdomen .05.**

Alate Vivipara. **Head and thorax brownish black; abdomen greenish black; antenna, cornicle, cauda, anal plate, tarsi and tips of tibiae black; rostrum dusky; tibiae yellow-brownish. Body length 1.3-2.2; across eyes .38-.40; antenna about 1.30; hind tibia .70-1.20; rostrum attaining 2d coxa. Hairs pointed; on hind tibia .03 (diameter of tibia .03); on side of body .05.**

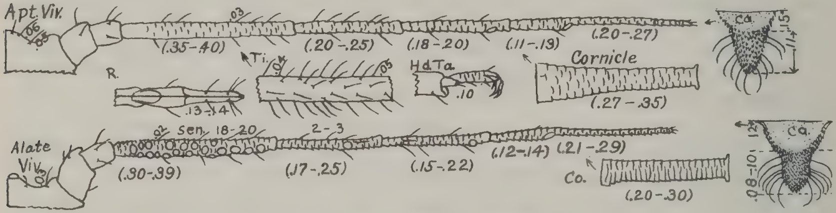

Fig. 143. *Aphis coweni*

Collections. On leaves of skunk cabbage *(Veratrum californicum)*. Colorado: Southwest corner of North Park, Cedaredge and probably Custer Co.* Apterous viviparae July 8, 22 and Aug. 20, alate viviparae July 22 and Aug. 20; probably not rare but region of host plant rarely visited by collectors.

Neotype. (Selected by the writer) U.S.N.M. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Dark body with pale legs, bushy cauda (about 6 hairs on each side), presence of a few sensoria on IV of alate vivipara, short unguis (shorter than III), rather long tibial hairs (.04-.05, equalling diameter of tibia), and short hind tarsal II (not longer than base of VI and shorter than rostral IV+V).

This species is very close to *A. fabae* but differs in length of unguis and hind tarsus.

Aphis crataegifoliae Fitch

The Long-beaked Clover Aphid or Hawthorn Aphid

Aphis crataegifoliae **Fitch, 1851:66; Baker, 1919c:185 (synonymy); Hottes and Frison, 1931a:190; Palmer, 1936b:735.**
Aphis brevis **Patch, 1915c:431.**

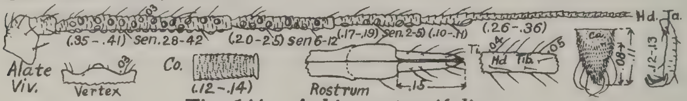

Fig. 144. *Aphis crataegifoliae*

Alate Vivipara. **Head and thorax black; abdomen yellowish to pinkish green with black lateral areas and dorsal dashes on abdominal VI, VII and VIII but no dorsal patch; appendages and cornicle brown to dusky; cauda pale; anal and genital plates dusky. Body length 1.7-2; across eyes .43; antenna 1.25-1.34; rostrum attaining between 2d and 3d coxae. Cornicle cylindrical, imbrications denticulate; cauda broad and tapering, bearing 3 hairs on each side. Hairs pointed, rather long and numerous.**

Male. **Alate. Head and thorax black; abdomen with lateral areas and dorsal bands on V-VIII blackish. Body length 1.5; across eyes .37; cornicle .06-.07; antenna bearing numerous sensoria. Otherwise as in alate vivipara.**

***Cockerell, 1893:365, No. 895.**

Collections. On leaves and twigs of *Crataegus* sp. as winter host, on red clover as summer host. Colorado: Fort Collins, Glade Park, and Eagle. Alate viviparae on winter host July 12, leaving summer host Sept. 3 to Dec. 9, alate male migrating Sept. 10 to Nov. 22; rather rare.

Cotypes. U.S.N.M.

This species is very close to *A. bakeri,* differing as follows: Presence of sensoria on V in alate vivipara, absence of dorsal patch in alate vivipara and the long rostral IV+V (.15 and attaining to 3d coxa or beyond).

Aphis crypta Pack and Knowlton

. *Aphis crypta* Pack and Knowlton, 1929:199; Knowlton, 1935c:139.

Apterous Summer Vivipara. **Dark green; appendages, cornicle and cauda dusky to black. Body length .95-1.20; across eyes .35; hind tibia .60; hind tarsal II .11; rostrum attaining 3d coxa.**

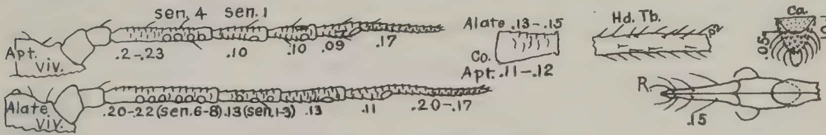

Fig. 145. *Aphis crypta*

Alate Vivipara. **Dark green with dark lateral spots; all appendages including cauda and cornicle black. Body length about 1.50; across eyes .37; hind tibia .80; hind tarsal II .13; rostrum attaining 3d coxa.**

Collections. On *Gutierrezia longifolia,* on underpart of crown and on roots to a depth of two to four inches, on celery *(Apium graveolens)* and on *Chrysothamnus nauseosus* subsp. *nauseosus.* Utah: Northeast of Great Salt Lake. Apterous viviparae July 3 and Aug. 3, alate viviparae July 3, Sept. 13 and Oct. 4; rare.

Type. Knowlton Collection. Paratypes, U.S.N.M.

This species appears to exhibit no reliable distinctive character separating it from *A. maidi-radicis.* From *A. gutierrezis* it is separated by no greater differences than are found in the limits of variation shown in *A. maidi-radicis.* It appears very probable that the supposedly two forms on *Gutierrezia* are but variants of the corn root aphid. However, the following facts throw some doubt on the synonymy just suggested, namely: *Gutierrezia* would be a new host for the corn root aphid and corn root aphid injury to corn was absent in that locality.

Further study, especially of oviparae, and biological experiments are needed to settle the question.

Aphis debilicornis (Gillette and Palmer)

Anuraphis debilicornis **Gillette and Palmer, 1929a:10 and 1932b:394.**
Aphis debilicornis, **Gillette and Palmer, 1932b:394; Hottes and Frison, 1931a:191.**

Apterous Summer Vivipara. **Body length 2; hind tibia 1; hind tarsal II .15; antenna 1.1. Smaller individuals showing no secondary sensoria and ranging in all measurements from four-fifths to equal to size of the smallest typical forms but otherwise indistinguishable from the typical form, were found mingled in several of the colonies, more numerous in late summer and fall.**

Alate Vivipara. **Head and thorax dull black; abdomen dark olive-buff; dusky on head, pronotum and lateral areas of abdomen and dorsal dashes on terminal abdominal segments; cornicle, cauda, antenna and greater part of legs dusky. Body length 2.6; hind tibia 1.1; hind tarsal II .15; antenna 1.1, secondary sensoria round, convex, somewhat tuberculate; rostrum slender, attaining 2d coxa. Cornicle without flange, slender and weak, not broader than hind tibia or III. Cauda tapering, bearing about 8 hairs on each side. Hairs pointed, sparse, semi-erect. Lateral tubercles present on prothorax and abdominal I and VII.**

Ovipara. **Dusky olive-green to brownish; antenna, beyond III, tips of tibiae, cornicle and cauda dusky. Body length 1.77; hind tibia .65-.80; antenna .87; cauda .12.**

Male. **Alate. Body length 1.50; hind tibia .73; antenna .95.**

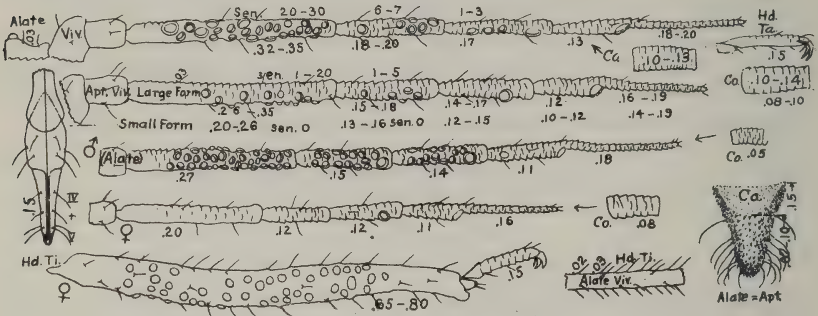

Fig. 146. *Aphis debilicornis*

Collections. On curled leaves and stems of *Helianthus annuus* and *H. tuberosus.* Colorado: Fort Collins, Colorado Springs and Loveland. Utah: Clarkston. Apterous summer viviparae July 2 to Sept. 26, alate viviparae July 5 to Sept. 24, males Aug. 31 to Sept. 29, oviparae Sept. 17 to 29; not common in region, but apparently widely distributed as specimens have been received from Iowa, Minnesota, Kansas and New Jersey.

Type. U.S.N.M., No. 41458. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Slender, weak, flangeless cornicle, tapering cauda, numerous tuberculate sensoria on III and IV of alate vivipara and usual presence of sensoria on III and IV of apterous vivipara. These characters separate this form from *A. helianthi* with which it has been confused.

Aphis eriogoni Cowen

Aphis eriogoni **Cowen (in Gillette and Baker), 1895:119; Gillette and Palmer, 1932b: 396.**

Apterous Summer Vivipara. **Black or brownish black with pattern of white reticulation covering all of dorsum except median portions of abdominal II and III, entire dorsum of V, and dorsolateral areas on mesonotum; antenna beyond middle of III, tarsi, tips of tibiae, entire cornicle, cauda, anal plate and rostral III, IV and V dusky. Body length 1.65-2; hind tibia .60-1.1; antenna .8-1.1; cauda bearing 2-4 hairs on each side and one preapical one; rostrum slender, attaining 2d-3d coxa.**

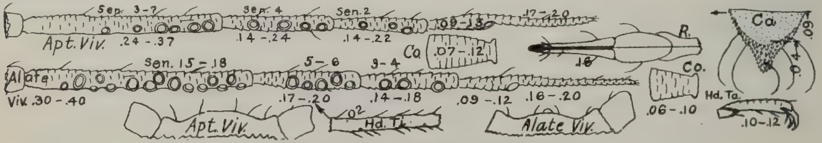

Fig. 147. *Aphis eriogoni*

Alate Vivipara. **Head and thorax blackish brown; abdomen yellowish olive-green mottled with olive-yellow, with dark bands on abdominal VI, VII and VIII and dark lateral areas on all segments; cornicle, antenna except base of III, tarsi and tips of tibiae black; terminal segments of rostrum dusky; cauda yellowish to slightly dusky; anal plate black. Body length 1.25-1.50; cauda tapering, acute, with 2-3 hairs on each side. Other measurements as in apterous vivipara. Lateral tubercles evident on prothorax, and abdominal I and VII. Hairs pointed, .03-.05 long, drooping to semierect on hind tibia.**

Collections. On leaves and stems of *Eriogonum alatum, E. inflatum, E. bakeri, E. effusum, E. flavum, E. subalpinum* and *E. umbellatum.* Colorado: Fort Collins, Boulder, Eldora, Clifton, Elkhorn, Steamboat Springs, Estes Park, Rist Canyon (near Bellvue), Lyons, Sparks and Owl Canyon (in Larimer County). Idaho: Hollister. Apterous summer viviparae May 30 to Sept. 6, alate viviparae May 31 to Sept. 6; fairly common.

Neotype. (Designated by the writer), U.S.N.M.

Aphis eriophori Walker

Aphis eriophori Walker, 1848:46.
Rhopalosiphum eriophori, Theobald, 1927:65; Hille Ris Lambers, 1934:26 synonym
Aphis viburnicola Gillette (erroneous synonymy).

Alate Vivipara, Spring Migrant. Alatoid Nymph. White. *Adult.* (Cleared and mounted), colorless with the following parts dark to black: Head, thorax, lateral areas on all abdominal segments, dashes on I and II and solid patch on II to VIII, antenna, except unguis which is lighter, legs, especially knees and tarsi, cornicle, cauda, anal plate. Body length 2-2.50; across eyes .44; antenna 1.2-1.45; hind tibia, 1-1.10; rostrum nearly to 2d coxa.

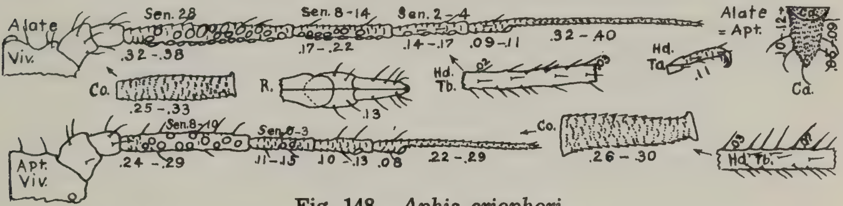

Fig. 148. *Aphis eriophori*

Apterous Summer Vivipara. (Cleared and mounted), dusky throughout body and appendages. Body 2 by 1-2.3 by 1.2; across eyes .47; antenna 1-1.1; hind tibia .90; rostrum attaining 2d coxa. Body surface posterior to head reticulated and lined with rows of minute denticles in both alate and apterous forms.

Collections. On hollyhock (probably accidental) near *Viburnum opulus* var. *sterile* the winter host, *Cyperus virens** as summer host. Utah: Ogden and Providence. Apterous viviparae* on summer host Nov. 1, alate viviparae on winter host May 7, fall migrants Sept. 18; rare.

Type. British Museum.

Chief Distinguishing Characters. Heavy slightly curved cornicle and coarsely denticulated imbrications of the same, denticulated reticulations on dorsum of body, shape of cauda and number of hairs (2 pairs and one preapical one) on the same, numerous sensoria on III of alate vivipara and their presence in aptera and length of tibial hairs (without equalling diameter of tibia).

Aphis fabae Scopoli

The Bean Aphid

Aphis fabae Scopoli, 1763:136 and 139; Jones (M.G.), 1942:67; Jacob, 1945:102 and 1947:431.
Aphis rumicis Linnaeus, Davidson (J.), 1921:81 (misidentification); Horsfall, 1925:1; Franssen, 1927:16; Theobald, 1927:98; Gillette and Palmer, 1932b:439; Hille Ris Lambers, 1934:27.

Fundatrix. Dark olive-green to black; cornicle, cauda and anal and genital plates black; antenna pale on III and IV (coalesced) and base of V, remainder blackish; tibiae pale with tips black; tarsi black. Body length 2.10-2.40; antenna .75-.95; cauda .12 on median line; rostral IV+V .12, attaining 2d coxa. Hairs on hind tibia .06-.08 long, numerous.

Apterous Summer Vivipara. Dark olive-green to sooty black; cauda, anal and genital plates and cornicle black; appendages mostly pale, distal half of rostrum dusky. Dorsal surface of body smooth or slightly reticulated. Body length 1.8-2.20; hind tibia 1.05; antenna 1.40.

Alate Vivipara. Alatoid Nymph. Blackish except meso- and metathorax which are pale green; abdomen tessellated, with 4 dorsal rows of powdery spots. *Adult.* Same in color and measurements as aptera. Rostrum obtuse with IV+V rather slender, attaining 2d to 3d coxa. Secondary sensoria not tuberculate. Hairs pointed; on tibia numerous, tibia appearing hairy. Cornicle cylindrical or slightly tapering, with flange and finely imbricated. Cauda cylindrical

*Taken in Berkeley, California, Nov. 1 by E. O. Essig.

with tendency to constriction near base, or spoon-shaped and bearing 3-4 lateral and 3 dorsolateral hairs on each side. Lateral tubercles well developed on prothorax and abdominal I and VII, quite small on remaining segments.

Ovipara. Apterous. Same color as apterous vivipara except hind leg dark throughout. Size 1.66 by .80; antenna .70-.90. Hind tibia greatly swollen throughout and covered with numerous sensoria.

Male. Alate. Color same as alate vivipara. Body length 1.50; antenna 1.15-1.40.

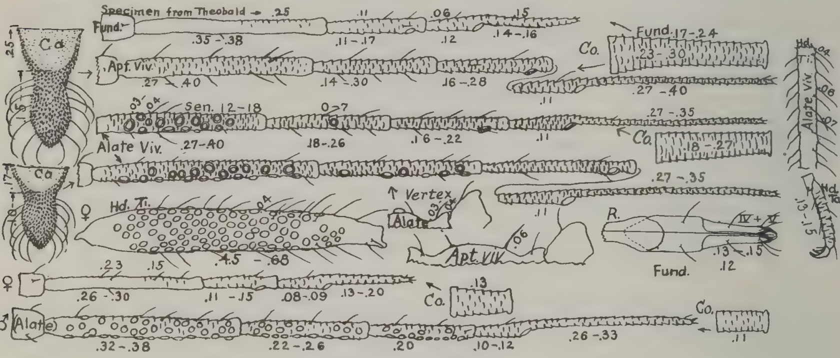

Fig. 149. *Aphis fabae*

Collections. As winter host on leaves and stems of strawberry bush (*Euonymus* sp.), high bush cranberry (*Viburnum opulus*) and snowball (*V. opulus* var. *sterile*); as summer host, the following: *Amaranthus retroflexus, Arctium* sp., beet (*Beta vulgaris*), *Capsella bursa-pastoris, Eupatorium* sp., squash (*Cucurbita maxima*), *Dahlia* sp., carrot (*Daucus carota*), *Gomphrena* sp., *Helichrysum* sp., lettuce (*Lactuca sativa*), *Oxytropis albiflorus*, parsnip (*Pastinaca sativa*), bean (*Phaseolus vulgare*), rhubarb (*Rheum officinalis*), *Rumex crispus*, and sp., ornamental elderberry (*Sambucus* sp.), nasturtium (*Tropaeolum majus*), nettle (*Urtica gracilis*), and corn (*Zea mays*). Throughout region. Fundatrices May 7, apterous summer viviparae May 7 to Nov. 15, alate viviparae May 10 to Oct. 27, sexuales Oct. 20 to 27; common.

Chief Distinguishing Characters. Dark olive-green to black body, bushy cauda, unusually long and numerous hairs on hind tibia, number of sensoria on antenna of alate vivipara (12-20 on III, 0-7 on IV), rather long rostral IV+V (.13-.15), much swollen hind tibia in ovipara bearing numerous large sensoria and alternation of hosts.

Aphis filifoliae Gillette and Palmer

Anuraphis filifoliae Gillette and Palmer, 1928:9.
Aphis filifoliae, Gillette and Palmer, 1932b:397

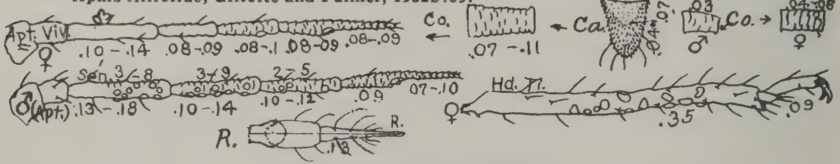

Fig. 150. *Aphis filifoliae*

Apterous Summer Vivipara. Brownish amber to dark brown or blackish with lighter brown pattern which is covered with white reticulation on pronotum, abdominal I, VI, VII, borders of VIII, median portion of V, and lateral surface of entire body; appendages pale buff except tips of antenna and tibiae and entire tarsi; cornicle black; cauda and anal and genital plates blackish. Body 1.10 by .50; hind tibia .35; antenna .50; hind tarsal II .09; rostrum acute, tip needlelike in ventral aspect, proximal hairs on IV longest. Hairs pointed, .03 long on body and appendages. Cauda tapering, rounded at tip, bearing 2 curved hairs on each side and 1-2 dorsal ones. Lateral tubercles well developed on prothorax and abdominal I and II.

Ovipara. Color and measurements same as in vivipara except body more elongate, length 1.20-1.50, and hind tibia, hardly swollen and bearing a few large, irregular-sized sensoria.

Male. Apterous. Color similar to vivipara. Body length 1; hind tibia .38; antenna .60.

Collections. On leaves and stems of *Artemisia filifolia* and *tridentata* and *Chrysothamnus nauseosus* subsp. *nauseosus.* Colorado: Fort Collins, Denver, Estes Park, Lay and Laramie-Poudre Tunnel. Utah: Brigham City and Wellesville. Idaho: Evanston and McCammon. Apterous viviparae July 10 to Aug. 12, sexuales Oct. 8; often in large numbers.

Types. U.S.N.M., No. 41975. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Body color and pattern of reticulation, sensoriation of hind tibia of ovipara and relative lengths of III, base of VI, unguis and cornicle (base of VI, unguis and cornicle all same length and but little shorter than III).

Aphis forbesi Weed

The Strawberry Root Aphid

Aphis forbesi **Weed, 1889c:148 and 1889b:273; Sanderson, 1900:3 (desc. of sexuales); Smith, (J.B.), 1909:24; Marcovitch, 1925:441 (life history); Gillette and Palmer, 1932b:392.**

Apterous Summer Vivipara. Dark green, mottled with yellowish; cornicle, cauda and anal and genital plates yellowish to dusky; tibiae pale to slightly dusky. Body surface reticulated. Body length 1-1.2; hind tibia .50-.70; hind tarsal II .08-.09; antenna .80-.90; rostrum obtuse, attaining abdomen. Hairs inconspicuous, very short and rather sparse.

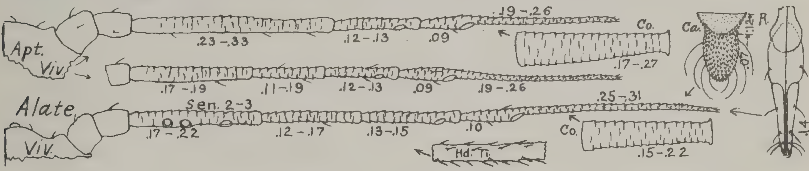

Fig. 151. *Aphis forbesi*

Alate Vivipara. Head and thorax dark; abdomen dark green, mottled with yellowish, with dark lateral areas and dorsal bands on abdominal VI, VII and VIII; cauda and cornicle yellowish to dusky; antenna dusky; legs yellowish, dusky at tips of segments. Measurements same as in aptera except as figured. Cauda broadly spatulate to parallel-sided, bearing 3-4 hairs on a side. Lateral tubercles blunt, evident on prothorax, and abdominal I and VII. Media of fore wing with 2d fork variable from obsolete to arising at half of the distance from margin of wing to 1st fork.

Collections. On roots and crown of strawberry *(Fragaria* sp.). Colorado: Greeley and Fort Collins. Utah: Farmington and North Salt Lake City. Apterous viviparae July 10 to Sept. 19, alate viviparae July 14 and Oct. 17; occasionally abundant.

Chief Distinguishing Characters. Length of unguis (1.25-1.33 times length of III), number of secondary sensoria (2-4 on III of alata), short cauda (length on median line shorter than base of VI) and length of rostrum (attaining abdomen).

Aphis frangulae Kaltenbach

Aphis rhamni **Kaltenbach, 1843:64 (preoccupied).**
Aphis frangulae **Kaltenbach, 1845:18, new name for *rhamni* Kaltenbach; Theobald, 1927:202; Gillette and Palmer, 1932b:398.**

Alate Vivipara. Dark green; cauda and anal and genital plates dusky; cornicle and antenna blackish; legs dusky yellow with tarsi and tips of tibiae blackish. Body length 1-1.2; hind tibia .63-.70; antenna .90-.95; rostrum attaining 3d coxa.

Apterous Summer Vivipara. Same in color and measurements as alate vivipara except the following: Antenna yellowish to middle of V and hind tibia .58-.63. Hairs pointed, rather sparse; on vertex and antenna .01-.02 long; on hind tibia drooping .02-.03 long. Cauda nearly parallel-sided, with slight neck, bearing 3-4 pairs of lateral hairs.

Collections. On *Nepeta cataria.* Colorado: Fort Collins. Utah. Numerous localities throughout the state. Idaho: Twin Falls. Apterous viviparae July 10 and with alate viviparae Sept. 4 and 5; abundant at times.

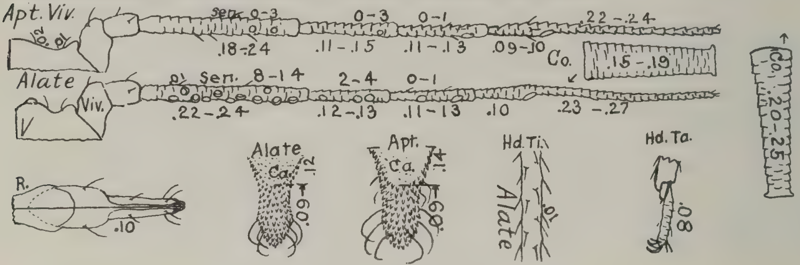

Fig. 152. *Aphis frangulae*

Chief Distinguishing Characters. The number of sensoria on III (8-14) and IV (2-4) in alata and the occasional presence of sensoria on these antennal segments in aptera and length of rostral IV+V (.10-.11) and attaining beyond 3d coxa.

Acknowledgments are due to Hille Ris Lambers for aid in determination of this form by comparison of our specimens with European material and contribution of determined specimens.

Aphis fraserae Gillette and Palmer

Aphis fraserae Gillette and Palmer, 1929a:16 and 1932b:399.

Apterous Summer Vivipara. Yellowish green, mottled with dark green, often blackish; appendages pale brownish, shading to dusky distally; cornicle and cauda and anal and genital plates dusky to black. Body length 2; hind tibia .83; antenna 1.16; rostrum attaining 3d coxa or abdominal I.

Alate Vivipara. Head and thorax black and lateral areas on abdomen blackish; otherwise same as aptera in color and measurements except body 1.66 and as figured. Cauda blunt, almost parallel-sided with 5-6 hairs on each side. Hairs pointed; on body .04 long, rather sparse; on hind tibia, rather numerous and nearly erect. Lateral tubercles evident on prothorax and well developed on abdominal I and VII.

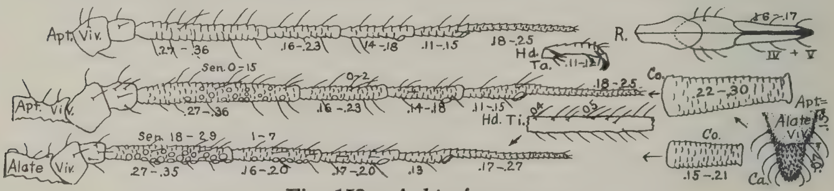

Fig. 153. *Aphis fraserae*

Collections. On flower pedicels of *Frasera speciosa.* Colorado: Bellvue, Boulder, Ward and Pingree Park. Idaho: Burley. Wyoming: Tie Siding. Apterous summer viviparae May 28 to Sept. 2, alate viviparae June 9 to Aug. 12; rather common.

Type. U.S.N.M., No. 41460. Paratypes, Colo. Agr. Exp. Sta. Collections.

Chief Distinguishing Characters. Yellowish green mottling in body color, short unguis (not longer than .27 and shorter than III), numerous sensoria on III of alate vivipara and occasional presence of sensoria on III of apterous vivipara.

This species seems to be very close to *A. lugentis* but differs as follows: Darker appendages, smaller body (not larger than 2), longer rostrum (IV+V .16-.17 long, as long as cauda or hind tarsal II, attaining beyond 3d coxa) and unguis (usually longer than IV instead of usually shorter). The differences are not definite and further data and biological transfer host tests are needed to settle the status of the species.

Aphis gossypii Glover

The Cotton Aphid or Melon Aphid (Plate VIII)

Aphis gossypii Glover, 1876:36; Gillette, 1908c:176; Patch, 1925b:186; Batchelder 1927:263 variability; Gillette and Palmer, 1932:392.

Apterous Summer Vivipara. Common Form. Pale yellow to pale sordid or yellowish green to mottled blackish green; antenna pale to dusky; legs pale with tips of tibiae and tarsi black; cornicle black; cauda, and anal and genital plate pale to dusky. Body length 1.1-1.8; hind tibia .50-.95; antenna .65-.80 (often five-segmented). *Small Form.* Body length .9-1; antenna .67-.77.

Alate Vivipara. Alatoid Nymph. Green with dorsum of abdomen flesh color; powdered on head and thorax and usually tesselated on abdomen. *Adult.* Head and thorax black; abdomen yellow-green without dusky markings except on lateral areas, spot behind cornicle base and sometimes (visible in cleared specimens), dashes on abdominal VI, VII, and VIII and occasionally, broken remnants on IV and V; legs pale with tarsi and tips of tibiae black; antenna rather dusky; cornicle black; cauda and anal and genital plates pale dusky to blackish. Body length 1.1-1.7; hind tibia .46-1.08; antenna .80-1, secondary sensoria large, arranged in a single row; rostrum attaining 2d-3d coxa. Hairs on antenna and hind tibia pointed, minute, and sparse. Cauda slightly spoon-shaped, bearing 2-3 hairs on a side. Lateral tubercles evident on prothorax and abdominal I and VII.

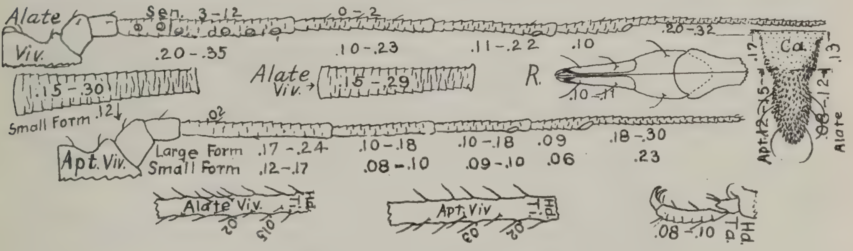

Fig. 154. *Aphis gossypii*

Collections. On leaves and twigs of *Amaranthus* sp., celery *(Apium graveolens), Asclepias* sp., *Aster* sp., *Begonia* sp., *Capsella bursa-pastoris, Catalpa* sp., *Cicuta douglasi,* melon *(Cucumis melo),* pumpkin *(Cucurbita pepo), Descurainia* sp., *Echinocystis lobata, Eupatorium* sp., *Galium* sp., *Hibiscus* sp., *Phaseolus* sp., dock *(Rumex crispus),* egg plant *(Solanum melongena), Verbena bipinnatifida, Wistaria* sp. Throughout region. Alate and apterous viviparae March to November; common and very abundant, often injurious.

Chief Distinguishing Characters. Variable color of body (from whitish lemon-yellow to blackish green in different individuals often in the same colony), color of cornicle (black), color of cauda (not black), number of caudal hairs (2-3 pairs, not bushy), small number of sensoria (not more than 12 on III and only rarely 1-2 on IV) on alate vivipara and tessellated pattern of the alatoid nymph.

This name is suspected of being a synonym of *A. sedi* Kaltenbach (Patch, op. cit.). In Colorado, *Sedum* is recorded only in the hills and mountains and so far no aphids have been collected here on this host.

This species is close to *A. symphyti* Schrank and appears identical with specimens so labelled by Hille Ris Lambers. However, Schrank says "cornicles very short, often black at tips only and thorax brownish" which description does not fit our specimens.

Aphis gregalis Knowlton

Aphis gregalis Knowlton, 1928a:259 and 1929a:6; Gillette and Palmer, 1932b:401.

Fundatrix. Color similar to summer apterous vivipara. Body length 1.80-2.50; antenna often five-segmented. Otherwise same as summer aptera.

Apterous Summer Vivipara. Bluish to yellowish, with head dusky and spots and broken dashes on dorsum of all body segments, sometimes broken or undeveloped on segments anterior to abdominal IV; covered with slight powder; appendages pale with tips of segments dusky; cauda, anal plate and cornicle black. Body length 1.20-1.85 long; hind tibia .67; hind tarsal II .12; antenna .60-.85 (III and IV often coalesced), III .16-.20, IV .09-.12, V .09-.13, VI .10-.12+.11-.14, sensoria 0-6 on III, 0-1 on V; cornicle .10-.17; cauda .05 on median line, .07 on side. Lateral tubercles well developed. Rostral IV+V .13, attaining 3d coxa. Cauda tapering, rounded at tip, bearing 4-5 hairs on each side.

Alate Vivipara. Head and thorax dark; abdomen yellowish to bluish green with traces of dusky dorsal bands especially on IV and V; cornicle dusky; cauda black. Body 1.4-1.7; hind tibia .75; antenna .85-.90; III .20-.25, IV .10-.15, V .10-.15, VI .10+.13-.15, sensoria 2-7 on III, 1-2 on IV; cornicle .12-.13; cauda .07 on median line, .12 on side.

Ovipara. Apterous. Head dusky; body "greenish red to reddish brown; pruinose; cauda and cornicle black. Body elongate, length 1.40-1.70; hind tibia .41," swollen for most of length and bearing numerous sensoria.

Male. Apterous. "Reddish brown to dusky, head and antenna black. Body length .92-1.15; hind tibia .53; cornicle .07." "Sensoria 10-23 on III, 6-17 on IV, 5-13 on V." Otherwise as in apterous vivipara.

Egg. "At first, light greenish; later, shining black. Length .70. Laid on scales and terminal parts of twigs."

Collections. On leaves and tender tips of *Chrysothamnus nauseosus* subspp. *nauseosus* and *viscidiflorus*. Throughout region. Apterous summer viviparae July 26 to Aug. 24, alate viviparae Aug. 6 and 7; rather common. Collections listed in original description of *A. ornata* Gillette and Palmer (1929a:5, line 4), from western slope of Colorado are now considered as belonging to this species.

Cotypes. U.S.N.M., Utah Agr. Exp. Sta., Colo. Agr. Exp. Sta. and Knowlton Collections.

Chief Distinguishing Characters. Pattern of broken bands and blotches on dorsum of apterous vivipara, slightly bent flangeless cornicle, small number of sensoria (2-7) on III of alate vivipara.

Not figured on account of structural similarity to *A. ornata.*

Aphis gutierreziae (Pack and Knowlton) n. comb.

Anuraphis gutierrezis Pack and Knowlton, 1929:200.

Apterous Summer Vivipara. "Yellow green, slightly pruinose"; cornicle, cauda, anal plate, tips of tibiae and antennal V and VI dusky; legs pale to slightly dusky. Body length 1.5-1.75; across eyes .38; hind tibia .52-.60; hind tarsal II .10; rostrum attaining to abdomen. Hairs on body and appendages very sparse and short, .015 long.

Ovipara. Apterous. Same as vivipara except hind tibia which, though not noticeably swollen, bears scattered minute sensoria.

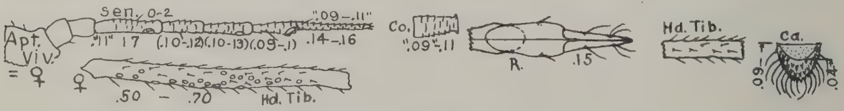

Fig. 155. *Aphis gutierreziae*

Collections. On *Gutierrezia sarothrae* on underpart of crown or roots, 2-4 inches deep, in colonies in crotches of the root. Utah: Honeyville, Lake Point and Santaquin. Apterous viviparae July 3 and Oct. 8, oviparae Oct. 8.

Type. Knowlton Collection. Paratypes, U.S.N.M.

This species resembles *A. maidi-radicis* but differs as follows: Unguis usually shorter than 1.5 times length of V and not longer than rostral IV+V, hind tibia less than half of the body length and in ovipara not swollen and not crowded with numerous sensoria and body not marked with dusky spots and dashes. However, some few viviparous individuals which fit these specifications occur among typical individuals of *A. maidi-radicis* in collections from corn roots.

This name may be a synonym of *maidi-radicis* but due to the small number of specimens and lack of alatae, from *Gutierrezia*, for study it seems best not to make a decision at this time. Further study of oviparae is needed to determine whether variability in swelling of the hind tibia may obliterate the apparent distinguishing difference in that character. Knowlton states that no injury to corn by root-louse was reported in the same locality at the same date.

Aphis helianthi Monell

The Dogwood or Sunflower Aphid

Aphis helianthi Monell, 1879:26; Gillette, 1927:346; Hottes and Frison, 1931a:196; Gillette and Palmer, 1932b:402.
Aphis oxybaphi Oestlund, 1887:62.
Aphis gillettei Cowen (in Gillette and Baker), 1895:120.
Aphis cornifoliae Fitch (misidentification), Gillette, 1910:407.

Fundatrix. Color similar to summer aptera or darker green with lighter mottling and covered with slight powder; appendages pale yellowish with tarsi and tips of appendages black; cornicle dusky distally. Body length 1.60; antenna .60, five-segmented; hind tibia .53.

Apterous Summer Vivipara. Head yellow-brown; rest of dorsum yellowish green mottled with medium to dark green and with dark green band on anterior portion of abdominal V; tibiae pale yellowish with tips of tibiae and tarsi black; cornicle black; cauda, anal plate and venter of abdominal VIII dusky. Body length 1.5-1.9; hind tibia .85-.90; antenna 1.1-1.3; cauda spatulate to parallel-sided; rostrum attaining 2d coxa.

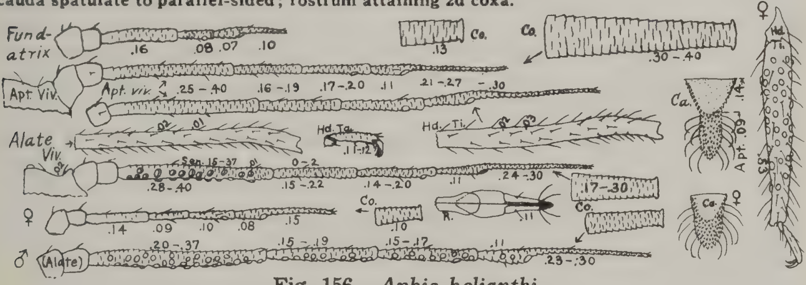

Fig. 156. *Aphis helianthi*

Alate Vivipara. Alatoid Nymph. Yellowish brown to green; tessellated. *Adult.* Head and thorax black; abdomen pale yellowish green, often with darker green band on abdominal V, with lateral areas, especially blotch behind cornicle and sometimes traces of darker to dusky dorsal bands especially on segments VI, VII and VIII; covered with very slight powder; cornicle, rostrum, cauda, anal plate, genital plate and antenna dusky to blackish; legs pale yellowish with tips of tibiae and tarsi dusky. Fall migrant often yellow-brown. Measurements same as in aptera except as figured. Secondary sensoria slightly convex, hardly tuberculate. Cauda bearing 5-6 hairs (in some cases only 3-4 evident) on each side. Hairs pointed, drooping, sparse, and short. Lateral tubercles evident on prothorax and abdominal I and VII.

Ovipara. Apterous. Head yellowish brown; body yellowish to dusky green, mottled with eggs showing through body wall; appendages except tips of segments, colorless and tarsi black; hind tibia pale to dusky, distinctly swollen and bearing numerous sensoria. Body 1.25; antenna .64-.77 often five-segmented.

Male. Alate. Head and thorax black; abdomen yellow-brown. Body length about 1.20-1.50; antenna 1.44.

Egg. Newly laid, pale greenish yellow; later, black, shining. Size .60 by .24.

Collections. On leaves and bark of twigs of *Cornus stolonifera* as winter host, on leaves of the following as summer hosts: *Amaranthus retroflexus, Ambrosia trifida* and *A. artemisiaefolia, Asclepias* sp., *Cirsium* sp., *Helianthus annuus* and *H. petiolaris, Iva xanthifolia, Mirabilis linearis* and *M. nyctaginea* and *Urtica gracilis.* Throughout region. Fundatrices March 30 to May 6 on winter host, apterous summer viviparae June 4 to Nov. 9 on summer hosts, alate viviparae on winter host April 19 to May 30 and Aug. 8 to Oct. 1, on summer hosts June 4 to Nov. 9, oviparae on winter host Sept. 6 to Oct. 24, alate males on both winter and summer hosts Sept. 15 to Oct. 24; slightly curling young leaves on *Cornus* in spring but no tendency to curl later either on summer hosts or *Cornus* in fall; very common.

Cotypes. Davis Collection.

The determination of this form is based on metatypes and detailed notes from Monell received in correspondence. He also determined Colorado specimens sent to him as his species.

The statements in original description that antennal III is "as long as the preceding taken together" and "nectaries......less than twice the length of the tarsi" are evidently errors as they differ from characters found in over a dozen metatypes and notes received from Monell. "Preceding" may be an error for succeeding and the cornicle of spring migrant, shorter than in later generations, may fail to equal twice tarsi. Gillette's statement (1910:405) that blackish patch at cornicle is absent in Monell's species is not valid as a distinction since this spot is not uniformly evident in the Colorado mounts.

A. oxybaphi Oestlund appears to be structurally inseparable from *A. helianthi,* differing only in the yellow color and perhaps averaging a little larger in size. Several years work in experimental transfers by Gillette and Bragg have demonstrated that this form thrives equally well either on *Helianthus* or *Oxybaphus.* In exchange of host the yellow color appears in most of the individuals after several generations on *Oxybaphus* and the green similarly on *Helianthus.* Individuals from both hosts take equally well to *Cornus* as winter host. *A. oxybaphi* Oestlund is accordingly placed as a synonym of *A. helianthi.*

A. yuccae Cowen appears structurally identical with *A. oxybaphi.* Experimental transfers by Gillette and Bragg, though not as extensively carried out as in the case of *A. oxybaphi,* seem to indicate that *A. yuccae* is at least a form of *A. helianthi.*

Aphis helichrysi Kaltenbach

The Leaf-curl Plum Aphid (Plate VII)

Aphis helichrysi Kaltenbach, 1843:102; Theobald, 1927:245; Smith (R.H.), 1921:422; Gillette and Palmer, 1932b:404 (desc. of sexuales erroneous) and 1936b:736.
Anuraphis padi (Linnaeus), Theobald, 1927:403 (disputed synonymy).
Aphis marutae Oestlund, Gillette and Palmer, 1936b:736 and 747 (det. of sexuales erroneous).

Fundatrix. Body length 2.30; antenna .53, five-segmented; hind tibia .50-.65.

Apterous Summer Vivipara. (On plum.) Pale green to lemon-yellow; shining; all appendages pale. Body length 1.1-1.3; hind tibia .50-.70; antenna .60-.80. Dorsal surface of body granular. Lateral tubercles minute. Rostrum surpassing 2d coxa. Cauda elongate-rounded to bluntly tapering, bearing 2-3 pairs of lateral hairs and one preapical one.

Alate Vivipara. Spring Migrant. Head and thorax black; abdomen green with dusky to glossy black dorsal patch on abdominal III or IV to tip of abdomen and dusky to black lateral areas on abdominal II, III and IV; cornicle pale to black; antenna blackish; tibiae brownish; cauda and anal plate pale. Body length 1.10-1.30; hind tibia .73-.96; antenna 1.15. Rostrum attaining 2d coxa.

Ovipara. Apterous. Body length .90; antenna .40, III and IV coalesced; hind tibia .30, conspicuously swollen and bearing numerous sensoria.

Male. Alate. Body length 1; antenna 1.10.

Collections. On plum (*Prunus domestica* and sp.) as winter host, tightly curling leaves; on the following summer hosts: On leaves and stems of *Achillea millefolium*, celery (*Apium graveolens*), *Ambrosia artemisiaefolia*, *Aster* sp., *Capsella bursa-pastoris*, Chrysanthemum, *Cineraria* sp., thistle (*Cirsium* sp.), *Dahlia* sp., *Erigeron canadensis*, *Eupatorium* sp., *Lappula* sp., apple (*Malus* sp.), *Malva rotundifolia*, *Mertensia* sp., *Onosmodium occidentale*, *Senecio* sp., *Tanacetum vulgare*, clover (*Trifolium hybridum*, *pratense* and *repens*), *Urtica* sp., and *Vinca* sp. Colorado: Fort Collins, Pingree Park, La Porte, Boulder, Palisade and Grand Valley. Utah: Salt Lake City, Providence, Hyde Park, Newcastle and Logan. Idaho: Berger, Buhl, Castleford, Hollister and Twin Falls. Fundatrices on plum April 15 to May 10; apterous summer viviparae on plum April 21 to June 21, on summer hosts May 16 to Dec. 3; alate vivipara May 11 to June 12 and Aug. 15 to Oct. 27 on plum and May 20 to Dec. 25 on summer hosts; sexuales Oct. 16 to Nov. 3 on plum; very common and injurious at times to plums and clover in Idaho as reported by Smith (op. cit.) and in western Colorado.

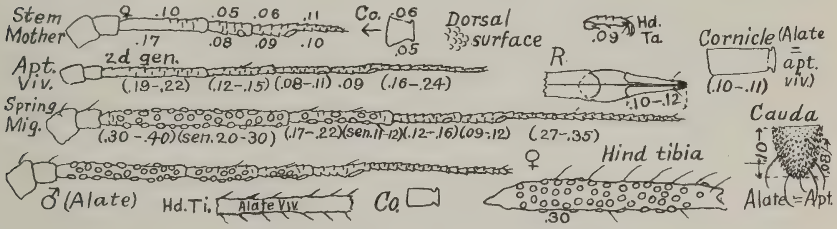

Fig. 157. *Aphis helichrysi*

This species is considered by Theobald (1927:403) to be the *A. padi* of Linnaeus. Since opinions of Hille Ris Lambers (1933:31) and Rogerson (1947:157) differ from that of Theobald as to the identity of *A. padi* it seems better to retain Kaltenbach's name.

Aphis heraclella Davis

The Wild Parsnip Aphid

Aphis heraclei Cowen (in Gillette and Baker), 1895:120 (preoccupied).
Aphis heraclella Davis, 1919:228 (n.n. for *heraclei* Cowen); Gillette and Palmer, 1932b:405.

Apterous Summer Vivipara. Deep green, mottled with yellowish green; distal half of antenna, cauda and anal plate dusky; cornicle, tarsi and tips of tibiae black. Body length 1.50-1.70; hind tibia .75-.90; hind tarsal II .14; antenna .95-1.33, III .27-.50, IV .13-.27, V .16--.22, VI .10-.14+.22-.31; cornicle .21-.40; cauda .10 on median line, .17 on side; rostral IV+V moderately slender, .12 long, attaining between 2d and 3d coxae. Cauda elongate, nearly parallel-sided, with tendency to constriction near base, bearing 3-4 pairs of lateral hairs and a single preapical one.

Alate Vivipara. Alatoid Nymph. Brownish yellow marked with green dorsolateral spots on abdominal I to IV and solid band on V; tesselated with white. *Adult.* Head and thorax black; abdomen deep green mottled with yellowish green, marked with dusky on lateral areas and dorsal dashes on abdominal VI, VII and VIII; antenna, cornicle, cauda and anal plate dusky; legs mostly pale. Body length 1.40-1.90; hind tibia .90-1; hind tarsal II .14; antenna 1.30-1.36, III .31-.49, IV .19-.30, V .17-.26, VI .10-.13+.25-.35, secondary sensoria tuberculate, scattered in two irregular rows over entire III, 15-28 in number; cornicle .16-.31; cauda .09 on median line, .15 on side. Hairs pointed, sparse; .02-.03 long on III and vertex; on hind tibia .025 (diameter of tibia .03). Lateral tubercles small.

Collections. On leaves and stems of celery *(Apium graveolens), Cicuta douglasi, Conium maculatum,* carrot *(Daucus carota), Heracleum lanatum,* and parsnip *(Pastinaca sativa).* Throughout region. Apterous summer viviparae May 18 to Oct. 6, alate viviparae May 10 to Oct. 11; common.

Neotype. (Selected by the writer). U.S.N.M.

This species appears to be structurally inseparable from *A. helianthi* unless a tendency to darker green color and usually longer antenna can be considered significant; but the range of shorter measurements overlap with the range of variation of *helianthi* so no line of distinction can be drawn. However, since no satisfactory host transfer tests have been accomplished the two forms are here retained as distinct.

Not figured on account of similarity to *A. helianthi* Monell.

Aphis hermistonii Wilson

Aphis hermistonii Wilson, 1915a:93; Gillette and Palmer, 1928:11 and 14 and 1932b: 406.

Apterous Summer Vivipara. Green with white powdery markings; cornicle black; cauda and anal and genital plates dusky to black; tarsi and tips of appendages and rostrum blackish. Body length 1.35; hind tibia .40-.50; hind tarsal II .10; antenna .85-.95; cauda .03 on median line, .08 on side; rostrum with needlelike tip in ventral aspect, IV+V .15 long, attaining abdominal I. Hairs pointed, fine, erect, sparse, .03 on vertex, antenna and hind tibia. Cauda tapering, short, .03-.05 long on median line and blunt, shorter than hind tarsal II, bearing 3 curved hairs on each side. Lateral tubercles developed on prothorax and abdominal I and VII.

Alate Vivipara. Same as aptera except as figured and the following: Hind tibia .50-.60; rostrum attaining 3d coxa. Secondary sensoria flat with narrow margins.

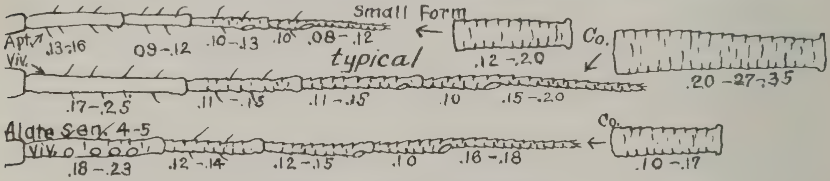

Fig. 158. *Aphis hermistonii*

Collections. On leaves and tender twigs of *Artemisia tridentata, A. filifolia* and *Chrysothamnus nauseosus* subsp. *nauseosus.* Colorado: Eckert, Craig, Redfeather, Steamboat Springs, Cherokee Park and Lay. Utah: Logan, Eden, Fish Lake and Duchesne. Apterous summer viviparae June 17 to Sept. 4, alate viviparae June 26 to Aug. 8; not abundant.

Cotypes. Granovsky Collection.

See discussion under *A. canae* (p. 126) or Gillette and Palmer (1928:14).

Aphis incognita (Hottes and Frison)

Aphis symphoricarpi Thomas (misidentification), Oestlund, 1887:50.
Cedoaphis incognita Hottes and Frison, 1931a:438.
Aphis incognita, Gillette and Palmer, 1932b:407.

Fundatrix. Pale green with head and dorsal bands and lateral areas on all segments dusky, bands on abdominal III, IV and V more or less coalesced; antenna and cornicle, distal half of rostrum, cauda and anal and genital plates blackish. Body 2.15-2.37 by 1.37-1.40, reticulated; antenna .80-.88, III and IV sometimes coalesced; hind tibia .70.

Apterous Summer Vivipara. Head dusky brownish, rest of body yellowish green; appendages pale with dusky tips; cornicle dusky but yellowish at base and surrounded by yellowish area. Cauda, anal and genital plates slightly dusky. Body 2-3 by 1.4-1.6; hind tibia 1; hind tarsal II .14; antenna 1.4-1.5, sensoria strongly tuberculate.

Alate Vivipara. Head and thorax black; abdomen yellowish green, with dark lateral spots anterior to cornicle and dark bands on abdominal VI, VII, and VIII; antenna, cornicle, cauda and legs blackish. Body length 1.66; hind tibia 1.9; antenna 1.3-1.5; rostrum attaining between 2d and 3d coxae. Antennal segments heavy, wider than hind tibia. Hairs on antenna

and vertex pointed, .015 long, sparse; on hind tibia drooping, .02-.03 long. Lateral tubercles very broad and shallow. Cauda hardly evident, tapering, broader than long, bearing numerous fine hairs on each side.

Collections. On *Symphoricarpos occidentalis,* on leaves during summer, on roots in winter and spring (fundatrices). Colorado: Fort Collins, Bellvue, and Cedaredge. Utah: Logan Canyon, Cowley, Daniels and Blacksmith Fork Canyons. Fundatrices May 31, apterous summer viviparae May 28 to June 16, alate viviparae May 28 to July 8; rare; usually found associated with *Brevicoryne symphoricarpi.*

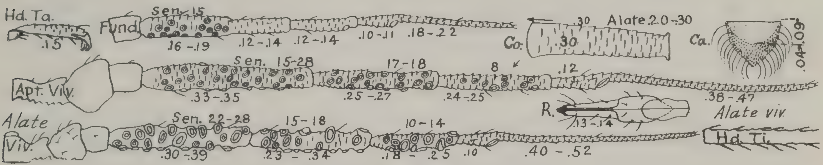

Fig. 159. *Aphis incognita*

The genus *Cedoaphis* was erected by Oestlund (1922:127) for this species on account of the peculiar lateral tubercles. Tubercles of this appearance, however, are also found in occasional species of widely separated genera, and accordingly do not seem to represent a generic complex.

Cotypes. Oestlund's specimens determined as *Aphis symphoricarpi* Thomas Univ. of Minn. Collection.

Aphis infrequens Knowlton

***Aphis chrysothamnicola* var. *infrequens* Knowlton, 1929c:38.**
***Aphis infrequens*, Knowlton and Smith, 1936g:778.**

***Apterous Summer Vivipara.* Antennal I and II dusky; tips of appendages, cornicle, cauda, tarsi and rostral III, IV and V blackish. Body length "1.55"-2; across eyes .45; hind tibia .87-.97; hind tarsal II .12; rostrum attaining to abdominal IV or V.**

***Alate Vivipara.* Head and thorax black; abdomen green with black markings; antenna, tarsi, cornicle, cauda and tips of tibiae dusky to black. Body length 1.50-"1.75"; across eyes .48; antenna 1.08-1.14; hind tibia 1; hind tarsal II .12; rostrum attaining abdominal III. Hairs simple, fine and erect; about .03 long on vertex, antennal III and hind tibia; on side of abdomen .04-.05 long.**

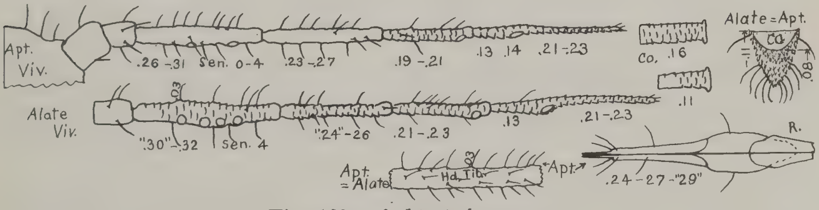

Fig. 160. *Aphis infrequens*

Collections. On *Artemisia tridentata,* on leaves; alate viviparae June 16 (resting?), on *Chrysothamnus parryi* apterous viviparae July 8 to Sept. 20. Utah: Trenton, Fountain Green, Lyman and Benjamin.

Type. U.S.N.M. or Knowlton Collection.

This species is very close to *A. chrysothamnicola,* differing chiefly as follows: Longer rostral IV+V (.27-.29, instead of .21-.23), presence of flange on cornicle, usual presence of sensoria on III of apterous vivipara and shorter cornicle (.10-.11 instead of .11-.16) in alate vivipara. However, a larger collection of alatae might show more variation in cornicle length. Length of rostral IV+V is a more constant character in aphids than that of other appendages and seems to definitely separate these two forms.

The infestation of these two host plants is unusual and perhaps doubtful. As the specimens from *Artemisia* were alatae they might have been only temporary visitors on this plant. *Chrysothamnus* was evidently a true host since here the aphids were colonized.

Aphis kachena Hottes

Aphis kachena **Hottes, 1934:2; Palmer, 1936b:737.**

Apterous Summer Vivipara. **Dark green, mottled with brownish black in areas and patches; antenna yellowish to dusky; cauda and anal plate brown to blackish; cornicle pale; tibiae pale with black tips. Body length 1.30-1.60; antenna .75-.90 (in some III and IV coalesced); hind tibia .60-.90; hind tarsal II .10-.11; rostrum surpassing 2d coxa. Dorsal integument heavily denticulate as is the cornicle. Lateral tubercles very small and pointed.**

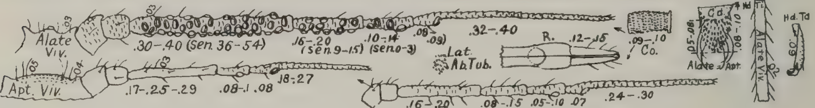

Fig. 161. *Aphis kachena*

Alate Vivipara. **Head and thorax dark brown; abdomen yellow-green with dusky dorsal bands or patch and lateral areas; cornicle pale to dusky; cauda and antenna dark; tibia yellow-brown. Body length 1.50-1.60; hind tibia .90-1; hind tarsal II .10-.12; antenna 1.10-1.30; cornicle cylindrical, with flange, covered with fine sharp points or denticles. Cauda bluntly tapering and bearing 3 pairs of hairs.**

Collections. In flower heads of *Castilleia rhexifolia* and sp. Colorado: Skyway, Grand Junction and Pingree Park. Utah: Hoop Lake, Bryce Canyon, Toquerville and Hurricane. Alate and apterous viviparae July 1 to Sept. 1, alate fall migrants until Oct. 15; rare.

Holotype. U.S.N.M. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Dark color of aptera with no dusky specks discernible at hair bases, numerous sensoria (not fewer than 36) on III of alate vivipara and very pronounced finely denticulate surface of the cornicle, especially in the aptera.

Aphis knowltoni Hottes and Frison

Chaitophoroides middletonii **(Thomas) (misidentification), Knowlton, 1929c:34.**
Aphis knowltoni **Hottes and Frison, 1931a:199.**

Apterous Fall Vivipara. **"Greenish blue to yellowish green; reticulated with grayish pruinose; lateral and dorsal black areas covering part of each body segment; cornicle, cauda and anal plate black." Body length 1.8-2.3; across eyes .40-.43; hind tibia .75-.90; antenna 1-1.20; rostrum attaining to 3d coxa. Hairs erect and fine; on antennal III .03-.05, on cauda at least 8-9 pairs.**

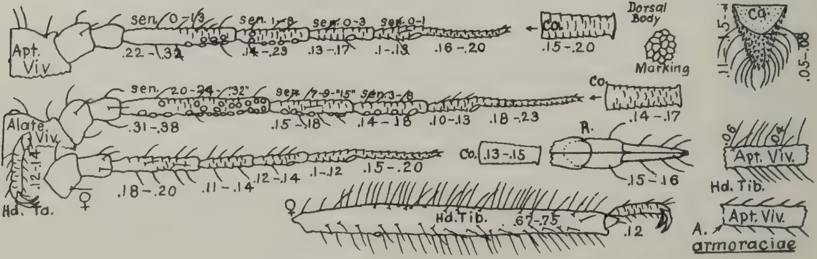

Fig. 162. *Aphis knowltoni*

Alate Fall Vivipara. "Head, thorax and appendages blackish to black; abdomen green with lateral patches of black; apical ends of antennal III, IV and V light." Body length 1.5-1.9; across eyes .40-.42; hind tibia .85-.95; antenna about 1.20 long; rostrum attaining 3d coxa.

Ovipara. Apterous. "Yellowish green or reddish green; reticulated grayish pruinose; with fewer black areas than vivipara; antennae and cornicles black." Body length 1.6-2; hind tibia .55-.75, slightly more robust than that of vivipara but sensoria hardly and rarely discernible, not more than two seen at most.*

Collections. On dandelion *(Taraxacum officinale)*, yarrow *(Achillea millifolium)* and corn *(Zea mays)*, infesting crown and root, "under the surface of the ground to a depth of about three inches." Colorado: Cherokee Park. Idaho: Riverdale. Utah: Logan. Alate and apterous viviparae Sept. 4 and 9, oviparae September 4 to 26; very numerous where occurring but infestations apparently rare.

Cotypes. Ill. Nat. Hist. Survey Collection, No. 8957 and 10865.

Chief Distinguishing Characters. Erect, fine, rather long (.04-.06), numerous hairs especially on the hind tibia also, though less numerous, on the antenna, number of sensoria (20-30) on III of alate vivipara, complete absence of sensoria on antenna of ovipara and near or complete absence of the same on hind tibia of ovipara.

Aphis laciniariae Gillette and Palmer

Aphis laciniariae Gillette and Palmer, 1929a:15 and 1932b:408.

Apterous Summer Viviparae. (Mounted on slide), cornicle, cauda and anal plate pale to dusky; tarsi and tips of appendages blackish. Body length 1.4; hind tibia .4-.5; hind tarsal II .10; antenna .75; rostrum attaining 3d coxa or abdomen. Cauda tapering, acute, bearing 3 pairs of lateral hairs.

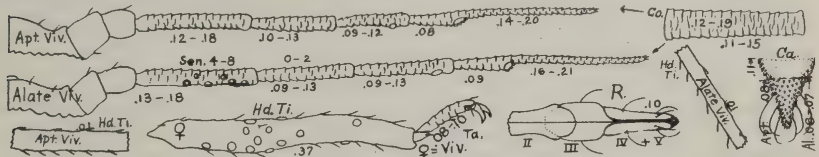

Fig. 163. *Aphis laciniariae*

Alate Vivipara. Same as aptera except as figured and rostrum attaining between 2d and 3d coxae. Secondary sensoria irregular in size. Lateral tubercles broad and blunt, present on prothorax and abdominal I to VI. Hairs pointed, minute, .01 long and very sparse on antenna, body and hind tibia.

Ovipara. Apterous. Body length 1.10; hind tibia .37; antenna .65, III .12, IV .10, V .09, VI .08+.16; cornicle .13. Otherwise as in apterous vivipara except hind tibia which is slightly swollen, bearing about 10 large sensoria along nearly entire length.

Male. Apterous. Body length 1; hind tibia .35; antenna .60, III .13, IV .10, V .08, VI .07+.15, sensoria small, 7 on III, 5 on IV, 7 on V; cornicle .08.

Collections. On leaves and stems of *Liatris punctata.* Colorado: Fort Collins and Boulder. Apterous summer viviparae July 5 to Sept. 7, alate viviparae July 5 to Aug. 28, sexuales Sept. 13 to Oct. 5; not common.

Type. U.S.N.M., No. 41459. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Short pointed cauda with only 3 hairs on each side, small number of irregular-sized sensoria on III of alate vivipara and the sensoriation of the hind tibia of the ovipara.

Aphis lugentis Williams

Aphis lugentis Williams, 1910:46 (in part); Davis, 1911b:15 (in part); Gillette and Palmer, 1932b:409.

Apterous Summer Vivipara. Dark olive or blackish green, often marked with dusky to black on head and dorsal bands and lateral areas on thorax, patch posterior to each cornicle and dorsal bands on abdominal VII and VIII, often broken on former; cauda, anal plate, genital plate, cornicle, and appendages black. Body length 2-2.8; dorsal surface reticulated; hind tibia .9-1; hind tarsal II .13; antenna 1.1-1.25; rostrum attaining between 2d and 3d coxae. Cauda parallel-sided, with slight constriction near base, blunt, bearing 6-7 hairs on each side.

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*More thoroughly cleared specimens might reveal more sensoria.

Alate Vivipara. Head and thorax black; abdomen blackish green. Same in measurements as aptera except as figured. Secondary sensoria round, medium in size. Hairs pointed, shorter than diameter of III. Lateral tubercles present, especially on abdominal I and VII.

Ovipara. Apterous. Color about as in apterous vivipara. Body 1.50-2 long, elongated posteriorly; hind tibia .60-.65; antenna .90. Hind tibia considerably swollen over almost entire length and bearing numerous sensoria.

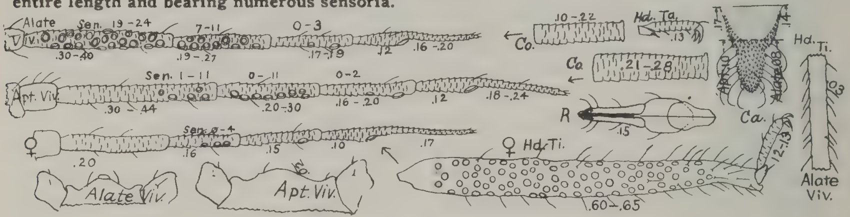

Fig. 164. *Aphis lugentis*

Male. Nymph. Bright orange to salmon. *Adult.* Alate. Head and thorax dark brown; abdomen dusky orange with lateral areas on all segments anterior to cornicle and short dorsal dashes from III to tip of abdomen dusky; appendages, cornicle and cauda blackish brown. Body hardly 2 long; antenna same as in alate vivipara except sensoria on III, IV and V usually somewhat more numerous.

Collections. On leaves, stems and roots of *Senecio atratus, S. pratensis, S. hydrophyllus, S. spartioides* and *S. triangularis* and *Erigeron* sp. Throughout region. Apterous summer viviparae May 26 to Oct. 22, alate viviparae June 12 to Oct. 13, oviparae Oct. 10 to 22, males Oct. 4 to 22; common.

Cotypes. U.S.N.M., No. 91 and Univ. of Nebr. Collection.

The determination of this species was made by comparison with cotypes. Our aptera agrees with Williams' aptera. His alata belongs to another species. The species name is held by the apterous form, its description preceding that of the alate form.

Chief Distinguishing Characters. Numerous sensoria on the antennae of both alate and apterous viviparae, bushy cauda, rather short unguis (shorter than the cornicle) and orange color of the nymph of the male.

Aphis lupini Gillette and Palmer

Aphis lupini Gillette and Palmer, 1929a:18 and 1932b:410; Knowlton, 1935a:112.

Fundatrix. Head black; rest of dorsum blackish green; all appendages black throughout. Body 3 by 2; hind tibia 1; antenna 1.20, III+IV (coalesced) .47, V .23, VI .15+.18; cornicle .21; cauda .26. Otherwise as in apterous summer vivipara.

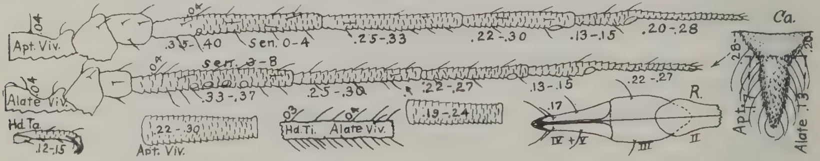

Fig. 165. *Aphis lupini*

Apterous Summer Vivipara. Dusky-olive to blackish green, shading to brown or black on head and dark dorsal bands on abdominal VII and VIII; legs pale or dusky; cornicle, anal plate and genital plate and cauda dark. Body 2-3 by 1.1-1.8; hind tibia 1.10; hind tarsal II .15; antenna 1.5; rostrum attaining between 2d and 3d coxae. Cauda tapering, acute at tip, with but slight constriction near base, bearing 6-10 hairs on each side.

Alate Vivipara. Same in color and measurements as aptera or slightly smaller. Veins of fore wing rather heavy, stigma dusky yellowish. Sensoria round, flat. Hairs pointed, .03-.04 long, rather sparse on body; moderately numerous and semierect on appendages, nearly as long as diameter of segment bearing them. Cauda bearing 8-10 pairs of lateral hairs. Lateral tubercles small but present on prothorax and all abdominal segments.

Collections. On leaves and stems of *Lupinus decumbens.* Colorado: Fort Collins, Boulder and Stove Prairie (above Bellvue). Utah: Grouse Creek, Reserve Creek, Raft River Mountains and Wellesville. Fundatrices May 22, apterous summer viviparae May 13 to Aug. 31, alate viviparae May 15 to July 6; common.

Type. U.S.N.M., No. 41462. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Peculiar, elongate, pointed shape and hairiness of the cauda, rather short unguis (shorter than III and about the same length as the cornicle) and the long rostral IV+V (.17, slightly longer than hind tarsus).

Aphis lutescens Monell

The Oleander and Milkweed Aphid

Aphis lutescens Monell, 1879:23; Gillette and Palmer, 1932b:411.
Aphis nerii Boyer de Fonscolombe (?), Thomas, 1879:95; Essig, 1911a:402 and 1911c: 530; Gillette and Palmer, 1932b:411.

Apterous Vivipara. Lemon-yellow on entire body or slightly brownish on head; antenna and hind tibia yellowish brown to dusky; blackish on femora, tarsi, distal portion of antenna and tips of tibiae; cornicle, cauda and anal plate black. Body length 2.2-3; hind tibia 1.10-1.50; antenna 1.50-1.63; rostrum attaining between 2d and 3d coxae.

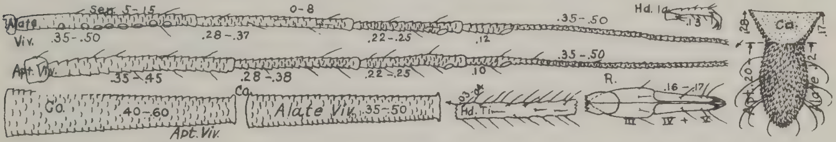

Fig. 166. *Aphis lutescens*

Alate Vivipara. Head and thoracic lobes dark; abdomen bright lemon-yellow; lateral areas on abdominal segments and blotch posterior to base of each cornicle dusky to black; cauda, anal plate, antenna and cornicle black; tibiae yellowish to dusky with tips and tarsi black. Same in measurements as aptera except as figured. Secondary sensoria rather large, not tuberculate. Hairs pointed, drooping, about .02 on antennal III; on hind tibia, as long as diameter of tibia and rather numerous; .04-.05 on body. Cauda bearing 3 pairs of lateral, 2 pairs of dorsolateral and one median preapical hairs. Lateral tubercles present on prothorax, and abdominal I and VII, but feebly developed.

Collections. On leaves and stems of *Asclepias subverticillata* and sp. Colorado: Fort Collins, Paonia, Rocky Ford, Fruita, Delta and Grand Junction. Apterous summer viviparae Aug. 12 to Oct. 14, alate viviparae Sept. 6 to Oct. 14; in crowded colonies, fairly common.

Chief Distinguishing Characters. Large black cauda (1-2 times length of hind tarsus), color of body (bright yellow), long black cornicle (as long as antennal III), long rostral IV+V (.16-.17) and number of sensoria on III of alate vivipara (5-15).

This species has been considered by several aphidologists to be *A. nerii* of Boyer de Fonscolombe (1841:179) instead of *A. lutescens* Monell, due to the fact that Monell mentioned no black patch at the base of the cornicle and, in correspondence, expressed doubt of its presence. However, Boyer also mentions no black patch at base of cornicle. Theobald (1915:129) considers *A. nerii* as lacking said black patch and cauda with only 3-4 pairs of lateral hairs. Aphids with the patch and 6-7 lateral hairs on cauda he places as *Myzus* *asclepiadis* Passerini (1863:25). However, Passerini's name (if applied to this species which undoubtedly belongs to the genus *Aphis)* is preoccupied by *A. asclepiadis* Fitch (1851:65), a different species.

Aphis maculatae Oestlund

The Spotted Poplar Aphid

Aphis maculatae Oestlund, 1887:61; Gillette and Palmer, 1932b:412.
Aphis populifoliae Fitch (misidentification), Davis, 1910d:489; Patch, 1913a:82.
Aphis davisi Patch, 1917:418.
Chaitophoroides populifoliae (Fitch), Knowlton, 1929c:36.

Apterous Summer Vivipara. Brownish black, lighter brown on head, with conspicuous patches of white powder on lateral areas and broken dorsal bands; cornicle, anal plate, genital plate and cauda black; appendages pale with dusky tips; rostrum dusky beyond middle of II; tarsi black. Body length 2.76; hind tibia 1.6; antenna 2; cauda tapering, rather slender.

Alate Vivipara. Head and thorax black; abdomen blackish brown; with pulverulent spots as follows: Lateral areas anterior to cornicle and a dorsal pair on abdominal I, IV, VII and VIII; cornicle and cauda black; antenna dusky throughout; tibiae pale with blackish tips; tarsi black. Body length 1.77; hind tibia 1.1; antenna 1.66, sensoria in irregular double row; rostrum attaining between 2d and 3d coxae.* Hairs nearly erect, numerous, somewhat resembling those in *Chaitophorus.* Cauda bearing 8-10 pairs of hairs. Lateral tubercles developed. *Young.* Light rusty brown, mostly covered with powder with only middorsum of abdominal II and III naked. *Alatoid Nymph.* Similar to apterous vivipara except meso- and metathorax gray.

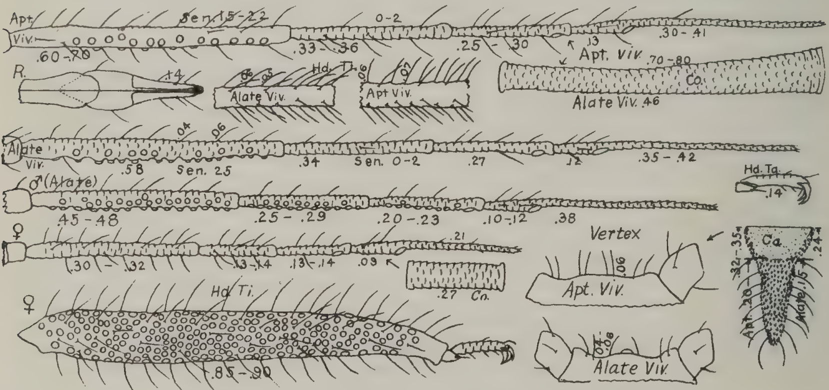

Fig. 167. *Aphis maculatae*

Ovipara. Apterous. Reddish brown; covered with heavy flocculence; cornicle and cauda dusky; hind tibia dusky brown; 1st and 2d tibiae pale with dusky tips; tarsi dusky. Body length 2.50; antenna 1; hind tibia .90; cornicle .27.

Male. Alate. Body length 1.40-2; antenna 1.60; hind tibia 1.10; cornicle .20.

Egg. Newly laid, amber brown; later, black; covered with slight powder.

Collections. On twigs and leaves of *Populus acuminata, P. angustifolia, P. nigra* var. *italica, P. sargenti* and *P. tremuloides* as summer hosts; *Cornus stolonifera* as winter host. Colorado: Fort Collins, Estes Park, Delta and Meeker. Utah: Paradise, Saint George, Providence, City Creek Canyon, the Upper American Fork Canyon, Birch Canyon, Big Cottonwood Canyon, Immigration Canyon and Smithfield Canyon and Tooele. Idaho: Immigration Canyon, Mink Creek and Circleville. Apterous summer viviparae June 4 to Sept.

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*These measurements seem considerably longer than those in the original description but agree with specimens received from Minnesota, collected by Hottes and compared with types in cooperation with Oestlund.

8, alate viviparae June 26 to Oct. 6, oviparae Sept. 8 to 28, males Aug. 24 to Sept. 10; viviparae and alate males all taken on *Populus*, oviparae on *Cornus;* infestations rare, but in large numbers where found occurring.

Cotypes. Univ. of Minn. Collection.

Aphis maidi-radicis Forbes

The Corn Root Aphid

Aphis maidis Fitch(?) (misidentification), Weed, 1887 and 1888:70.
Aphis maidi-radicis Forbes, 1891:64 and 1894:58; Garman, 1898:177 (desc. of ovipara); Webster, 1907:4 (desc., habits and control); Davis, 1909b:123 (life hist. and bibliog. to date); Vickery, 1910:97 (acct. of extensive experiments); Gillette and Palmer, 1932b:414.

Apterous Summer Vivipara. Pale bluish green with more or less dusky markings on head, pronotum, lateral areas and narrow or broken dorsal bands on meso- and metanotum and abdominal I, VII and VIII; antenna, cornicle, rostrum, cauda and anal and genital plates dusky; legs dusky except middle of tibiae. Body length 1.80; hind tibia .80; hind tarsal II .10; antenna .70; rostrum attaining 3d coxa or abdominal I.

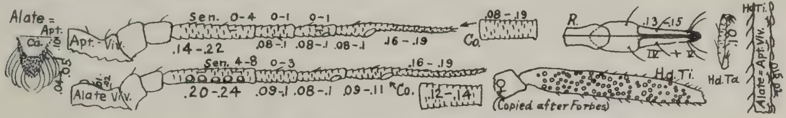

Fig. 168. *Aphis maidi-radicis*

Alate Vivipara. Head and thorax black; abdomen pale green, with lateral areas anterior to cornicles, patch posterior to base of each cornicle and short dorsal bands on abdominal VI, VII and VIII dusky. Body length 1.50; hind tibia .70; hind tarsal II .10; antenna .70, secondary sensoria hardly tuberculate, in single row; rostrum attaining between 2d and 3d coxae. Hairs pointed, inconspicuous, drooping and sparse; .01-.02 long on antenna, body and hind tibia. Cauda broadly tapering, rounded at tip, bearing about 6 hairs on each side. Lateral tubercles developed on prothorax, and abdominal I and VII, inconspicuous or absent on other segments.

Male. Apterous according to Davis (op. cit.), Weed (1888:70), Forbes (op. cit.), but alate according to Vickery (op. cit.).

Collections. On roots of *Artemisia frigida* and *A. aromatica, Aster* sp., *Helianthus* sp., *Descurainia* sp. and corn *(Zea mays).* Colorado*: Julesburg, Sedgwick, Lamar and Denver. Utah: Farmington, Roosevelt, and Castle Valley. Idaho: Riverdale. Apterous viviparae June 8 to Aug. 11, alate viviparae Aug. 20; rather rare. No serious damage to corn reported west of the 102d meridian.

Chief Distinguishing Characters. Bluish green body with slight dashes, short antenna (III .24), short cornicle (.14 in alata, .20 in aptera), few sensoria on III (8), short, bushy cauda and long rostral IV+V (.14-.15).

This species appears structurally very close and doubtfully separable from *A. middletonii* Thomas. Perhaps it should be placed as a variety. However, more biological tests should be carried out to decide the question.

The study of this species was greatly aided by the examination of more than two dozen slides, labelled *A. maidi-radicis* and *A. middletonii* determined by several aphidologists, loaned by T. H. Frison and H. H. Ross also one or two slides contributed by Geo. G. Ainslie collected in work in cooperation with Vickery (op. cit.).

Aphis medicaginis Koch

The Cowpea Aphid

Aphis medicaginis Koch, 1854:94; Essig, 1911c:527; Gillette and Palmer, 1932b:416.
Aphis laburni Kaltenbach (misidentification), Theobald, 1927:122; Hille Ris Lambers 1934:27 (criticism on *A. laburni* Kaltenbach according to Theobald).

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*Statement by Gillette (1910:405) that this species is fairly common on corn at Fort Collins evidently refers, at least in part, to *A. armoraciae* as shown by the drawings and hosts given as well as slides of those dates in the collection. No serious corn root-aphid injury has attracted attention at Fort Collins.

Apterous Summer Vivipara. Black on entire dorsum, polished in adult, dull and pulverulent with slaty grayish tint in nymph, pale grayish green in new-born young; cornicle, anal plate, genital plate and cauda black; appendages whitish with blackish tips. (Cleared and mounted), head dark and dark bands including lateral areas on all segments, broken anterior to abdominal II, mostly coalesced into a solid patch on abdominal II to VIII. Body length 1.6-1.9, width 1-1.1; hind tibia .90; hind tarsal II .12; antenna 1.1; rostrum attaining about to 3d coxa. Cauda nearly parallel-sided, rounded at tip, bearing 2-4 hairs on each side and one dorsal preapical one.

Alate Vivipara. Same in above described characters as apterous vivipara except (cleared and mounted) dark markings as follows: Head and thorax and on abdomen lateral areas and dorsal bands, the latter varying from nearly coalesced to greatly broken and fragmentary on abdominal I to IV. Hairs pointed, drooping, sparse; on antenna about .01-.02 long; on tibia .03. Lateral tubercles prominent on pronotum and abdominal I, II and VII, usually present but smaller on intervening segments.

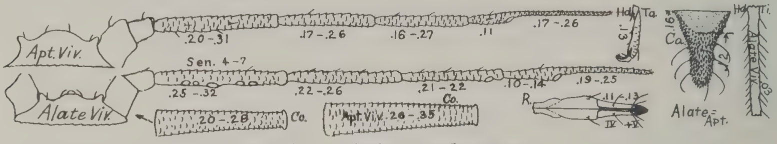

Fig. 169. *Aphis medicaginis*

Collections. On leaves and stems of locust *(Robinia* sp.) as winter host; as summer hosts: *Amaranthus* sp., *Aragallus* sp., *Astragalus* sp., shepherdspurse *(Capsella bursa-pastoris),* lambsquarters *(Chenopodium album),* bee spiderflower *(Cleome serrulata),* dodder *(Cuscuta* sp.), carrot *(Daucus carota),* tansymustard *(Descurainia* sp.), *Eriogoum alatum, Gaura coccinea, Glycerrhiza lepidota, Kochia scoparia,* lettuce *(Lactuca* sp.), pepperweed *(Lepidium* sp.), apple *(Malus* sp.), *Malva neglecta* and *M.* sp., alfalfa *(Medicago sativa),* white sweetclover and yellow sweetclover *(Melilotus alba* and *officinalis), Oxytropis* sp., lima bean *(Phaseolus lunatus),* kidney and pinto beans *(P. vulgare), Polygonum* sp., *Rumex* sp., *Salsola* sp., *Solidago* sp., *Taraxacum officinale,* red clover *(Trifolium pratense),* wheat *(Triticum vulgare), Vicia* sp., and *Vigna sinensis.* Throughout region. Apterous summer viviparae March 25 to Nov. 10, alate viviparae April 3 to Nov. 19; very common.

Chief Distinguishing Characters. Whitish appendages, shining black body of adult, dull pulverulent slaty gray color of nymph and small number of sensoria on III of alate vivipara.

Some aphidologists consider this species identical with *A. laburni* Kaltenbach but Kaltenbach says antenna "gekornt" which better fits *A. fabae.*

Aphis menthae-radicis Cowen

Aphis menthae-radicis Cowen (in Gillette and Baker) 1895:121; Gillette and Palmer, 1932:417.

Apterous Summer Vivipara. Green with black dorsal dashes; to the naked eye apparently a dull lead color; appendages mostly black. Body length 1.8-2; hind tibia .73-.80; antenna .75-.80.

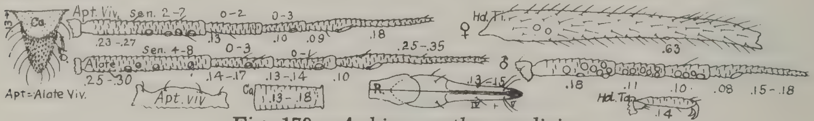

Fig. 170. *Aphis menthae-radicis*

Alate Vivipara. Abdomen green; head, thorax, lateral areas and dorsal dashes on abdomen black. Body length 2; hind tibia .95; antenna 1.03, sensoria unequal in size, arranged in irregular single row; rostrum attaining between 2d and 3d coxae. Cauda broadly tapering, blunt, bearing 6-8 hairs on each side and a dorsal preapical one near tip. Hairs pointed, drooping; .02-.03 long on III and vertex. Lateral tubercles present.

Ovipara. Apterous. Body length 1.6; hind tibia .63; hind tarsal II .12; otherwise as in apterous vivipara except hind tibia which is slightly swollen on proximal third and bearing a few scattered faint sensoria.

Male. Apterous. Body length 1.2-1.3; hind tibia .60; antenna .70; cornicle .08.

Collections. On roots of *Aster* sp., *Artemisia aromatica, Mentha canadensis* and dandelion *(Taraxacum officinale).* Colorado: Hotchkiss and Fort Collins. Apterous summer viviparae July 14 to Nov. 5, alate viviparae July 14, sexuales Nov. 5; not common.

Cotypes. U.S.N.M.

Chief Distinguishing Characters. Length of antenna (1.03, III .23-.30), length of hind tarsal II (.14) and character of hind tibia of ovipara.

This species is very close to *A. middletonii* Thomas and *A. maidi-radicis.* It was stated to be a synonym of the latter species by Vickery (1910:112) acting on the tentative opinion of Gillette (expressed in correspondence) on comparing viviparae. Gillette (Vickery, op. cit.) stated that there were slight differences but doubted their being sufficient to separate the species. Later a study of sexuales shows the hind tibia of the ovipara of *menthae-radicis* to be less swollen and bearing a much smaller number of sensoria than in *maidi-radicis.*

Aphis minutissima Gillette and Palmer

Anuraphis minutissima Gillette and Palmer, 1928:8.
Aphis minutissima, Gillette and Palmer, 1932b:420.

Apterous Summer Vivipara. Dark brown to black; covered throughout with powdery reticulations; appendages black except base of antennal III and middle of tibiae which are dusky. Body length .95-1.25; hind tibia .30-.40; hind tarsal II .09; antenna .40-.50; rostrum attaining abdominal I. Hairs as in alate vivipara except on vertex .04-.05.

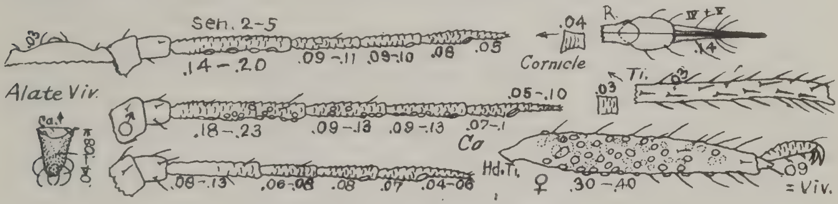

Fig. 171. *Aphis minutissima*

Alate Vivipara. Black throughout; abdomen covered with white powdery reticulation; otherwise as in apterous vivipara. Body length 1.30; hind tibia .50; antenna .54-.60; cornicle, cauda and hind tarsal II as in apterous vivipara. Hairs pointed; sparse and .01 long on III; on vertex .03; on hind tibia .03, rather numerous. Cauda broadly tapering, bearing two pairs of lateral and one pair of dorsal preapical hairs.

Ovipara. Apterous. Color same as apterous vivipara. Body length 1.35, other measurements as in vivipara. Hind tibia conspicuously swollen and bearing numerous large sensoria.

Male. Alate. Color same as alate vivipara. Body length .90 to 1; hind tibia .40; antenna .60, with numerous sensoria on III, IV and V.

Collections. On leaves and stems of *Artemisia filifolia* and *A. tridentata.* Colorado: Denver. Utah: Trenton, Brigham and Castleford. Idaho: Twin Falls and Rexburg. Apterous summer viviparae April 30 to Oct. 8, alate viviparae July 10 and Aug. 14, sexuales Oct. 8; rather rare but abundant at times.

Type. U.S.N.M., No. 41973. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Very short cornicle and cauda, small number of hairs on the cauda, short unguis (shorter than base of VI), uniform covering of white reticulation on dorsum and much swollen hind tibia of ovipara, covered with rather large sensoria.

Aphis monardae Oestlund

Aphis monardae **Oestlund, 1887:58; Gillette and Palmer, 1932b:421.**

Apterous Summer Vivipara. "Abdomen greenish, with much mottling of black above. Honey tubes black"; cauda and anal plate dusky, legs mostly pale; antenna and cornicle dusky. Body length 1.2-1.5 width 1; hind tibia .70; hind tarsal II .10; antenna 1.1; rostrum attaining 2d coxa.

Alate Vivipara. Same as aptera as to above characters. Sensoria on III 5-7 large ones in single row, sometimes 8-12 smaller ones in irregular double row, appearing as though resulting from dividing of normal sensoria, on IV 2-4. Hairs inconspicuous, sparse, drooping; on III .01 long, on hind tibia .02. Cauda bearing 3-4 pairs of lateral and one median preapical hair. Lateral tubercles well developed on prothorax, and abdominal I and VI. Media of fore wing with 2d fork varying from hardly fourth to over third of distance from margin of wing to 1st fork.

Male. Alate. Same as alate vivipara except as follows: Cornicle .07 and antenna bearing sensoria on III, IV and V.

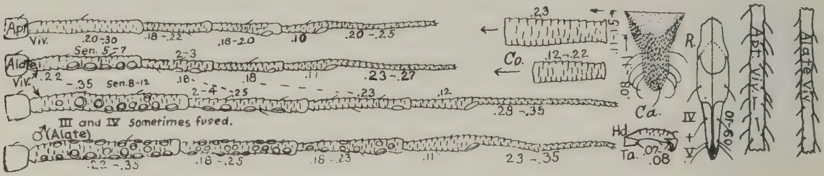

Fig. 172. *Aphis monardae*

Collections. On leaves and flower heads of *Monarda* sp. Colorado: Boulder and Fort Collins and Canyon of Big Thompson River. Utah: Monte Cristo and Logan Canyon. Idaho: Twin Falls and Emigration Canyon. Apterous summer viviparae June 6 to Aug. 21, alate viviparae May 30 to Aug. 2, males Nov. 10; fairly common. Neither fundatrices nor oviparae have been taken and alatae were taken earlier than apterae. These facts together with the alate condition of males suggest the existence of an alternate host. No differences between this species and *A. abbreviata* Patch seem to be evident. This fact suggests Patch's species as the winter cycle form of Oestlund's species; but without biological transfer tests the synonymy cannot safely be declared.

Cotypes. Univ. of Minn. Collection.

Chief Distinguishing Characters. Number of sensoria (5-12) on III and 2-4 on IV in alate vivipara, shortness of the cornicle (hardly longer than .20), number of caudal hairs (3-4 lateral pairs), black cornicle and occasional coalescence of III with IV in both alata and aptera.

This species is very close to *A. gossypii* and *A. nasturtii.*

Aphis nasturtii Kaltenbach

Aphis nasturtii **Kaltenbach, 1843:76; Theobald, 1927:139; Palmer, 1936b:738.**

Apterous Summer Vivipara. Pale green; antenna, cornicle, anal plate and cauda brownish; tibiae pale with dark tips; rostral III, IV, and V and antennal V and VI dusky. Body length 1.5-1.9; across eyes .34; hind tibia .60-.65; antenna .62-.70 in some and .85-.95 in others which are otherwise identical. Cornicle cylindrical with somewhat broadened base; cauda parallel-sided, bearing 2 pairs of lateral hairs. Hairs inconspicuous, .02-.03 on hind tibia, .015 on antennal III.

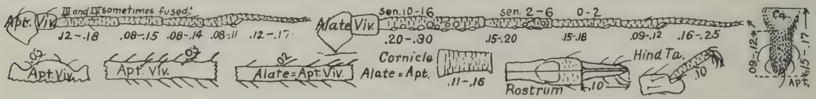

Fig. 173. *Aphis nasturtii*

Alate Vivipara. Head and thorax dark; abdomen pale green with lateral areas dark and denticulate; appendages including rostrum, dusky except tibiae which are yellowish with dark tips; anal plate blackish. Body length 1.4-1.6; across eyes .34; hind tibia .70-.93; antenna .85-1; rostrum reaching 2d coxa. Otherwise as in apterous vivipara.

Collections. On leaves and stems of *Roripa obtusa, R. hispida, R. sinuata* and *R.* sp. Colorado: Fort Collins and Pingree Park. Utah: Salt Lake and Locomotive Springs. Alate and apterous viviparae April 10 to Oct. 30.

Chief Distinguishing Characters. Number of sensoria on III of alate vivipara (usually more than 12), number of lateral pairs of caudal hairs (not more than 2-3) and length of rostral IV+V (.10).

Aphis neilliae Oestlund

Aphis neilliae Oestlund, 1887:59; Gillette and Palmer, 1932b:422.

Fundatrix. Same as apterous summer vivipara except as follows: Antenna .60-.63, III and IV coalesced; hind tibia .60; cornicle .09.

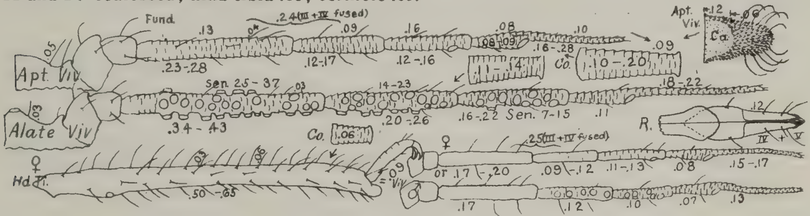

Fig. 174. *Aphis neilliae*

Apterous Summer Vivipara. Dark olive-green to black, sometimes mottled with lighter green; rostrum, cornicle, cauda and anal plate blackish; tibiae pale with black tips. Body length 1.3-1.8 width .8-1; hind tibia .80-.95; hind tarsal II .10; antenna .90-1.1; rostrum attaining between 2d and 3d coxae. Hairs pointed; erect and rather numerous on hind tibia and sides of body. Cauda broadly tapering, bearing about 5 pairs of lateral hairs. Small individuals, possibly apterous sexuparae taken in late summer measured .85-.90 in length; hind tibia .45; antenna as in ovipara.

Alate Vivipara. Same as aptera except as follows: Antenna 1.10-1.20, secondary sensoria conspicuously tuberculate. Hairs pointed, slightly longer than diameter of antenna or tibia, semierect to erect, fairly numerous on tibiae. Lateral tubercles large on prothorax and abdominal I and VII. Fore wing with 2d fork of media usually nearer the margin than third of the distance to 1st fork.

Ovipara. Apterous. About the same as apterous vivipara except as follows: Body more elongate, length 1.20-1.50; antenna .70; hind tibia with proximal third slightly swollen and bearing 1-8 rather large faint sensoria.

Male. Apterous. Body length about .90; hind tibia .45; cornicle .05; antenna .70.

Collections. On leaves and stems of *Physocarpus monogynus*. Colorado: Fort Collins, Boulder, Manitou and Rocky Mountain National Park. Idaho: Murtaugh and Wendell. Fundatrices April 16, apterous summer viviparae June 2 to Aug. 25, apterous sexuparae (?) Aug. 11 to 31, alate viviparae June 2 to June 15, oviparae Sept. 15 and Oct. 29; a single apterous male Oct. 29; rather common.

Cotypes. Univ. of Minn. Collection.

Aphis neogillettei Palmer

Aphis cornifoliae Fitch ("other collections"), Gillette and Palmer, 1932b:394, line 20.
Aphis neogillettei Palmer, 1938:352.

Fundatrix. Same as summer apterous vivipara except antenna shorter, .65-.75 long, III and IV coalesced; otherwise as in ovipara.

Apterous Summer Vivipara. Dark olive-green; appendages pale yellow, with antennal VI, tarsi, tips of tibiae, cornicle and cauda blackish. Body length 1-1.40; hind tibia .50-.70; antenna 1.05; rostrum attaining 3d coxa. Hairs on hind tibia fine, erect. Lateral tubercles large.

Sexuparae (?). Apterous. Same as summer aptera except as follows: Body smaller, .90-1.10 long; antenna .75 long, III and IV coalesced.

Alate Summer Vivipara. **Head and thorax black; abdomen dark olive-green without markings; antenna, except base of III, cornicle and cauda dusky; legs pale brownish with tarsi and tips of tibiae black. Body length 1.30-1.60; hind tibia .70-.90; antenna 1.10; rostrum obtuse, attaining beyond 3d coxa. Hairs on hind tibia nearly erect, longer than diameter of tibia. Lateral tubercles rather large. Cornicle cylindrical or slightly tapering, with slight flange; cauda bluntly tapering, nearly as broad as long.**

Ovipara. **Apterous. Brownish olive-green, yellowish to golden on middle of dorsum due to eggs showing through body wall. Body length .9-1.15; antenna .55-.75; hind tibia .40-.55; not perceptibly swollen and bearing about 3 sensoria; rostrum attaining abdomen.**

Male. **Apterous. Olive-brown; with appendages light yellowish brown. Length 1; hind tibia .43; antenna .70-.83.**

Egg. **Newly laid, golden brownish yellow; later, shining black. Size .60 by .26.**

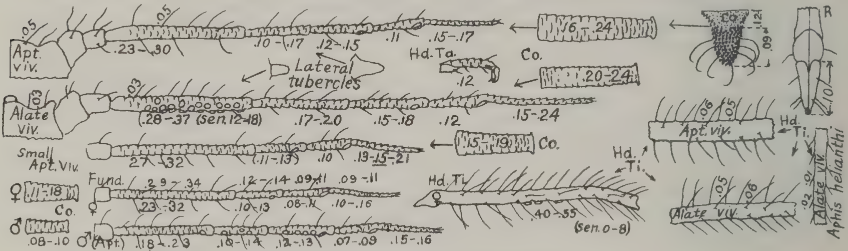

Fig. 175. *Aphis neogillettei*

Collections. On leaves of *Cornus stolonifera* which it causes to curl very badly. Colorado: Boulder and Fort Collins. Utah: Logan, Morgan and Swan Creek. Fundatrices May 1 to 3, apterous summer viviparae June 16 into Aug., apterous sexuparae (?) Aug. 19 to Oct. 2, alate viviparae late May to July 1, sexuales Sept. 3 to Oct. 6, eggs laid on twigs, in the axils of leaves and around the buds beginning Sept. 18; rare but infestations may be heavy where occurring.

Type. U.S.N.M., No. 52348. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Dark green body, short cauda with only 3 pairs of lateral hairs, large lateral tubercles, scarcity of alate viviparae except from late May to late June and bristly, erect hairs on antenna and hind tibia, longer than diameter of III or hind tibia.

From *A. cornifoliae* this species differs in the greatest number of sensoria on III of alate vivipara (more than 8) and the color of body in viviparae (not brown).

From *A. helianthi,* with which it has been confused, this form differs as follows: Longer more erect hairs on III and hind tibia, shorter measurements in all parts, coalesced condition of antennal III and IV in sexuparae (?), apterous form of male, hind tibia of ovipara not noticeably swollen and bearing very few sensoria instead of many and time of egg-laying (beginning in early September and reaching its height when the fall migrants of *A. helianthi* are just arriving to deposit the oviparae).

Aphis neomexicana (Cockerell)

The New Mexico Gooseberry Aphid

Myzus neomexicana Cockerell, 1901:227.
Aphis neomexicana Gillette and Palmer, 1932b:423; Allen and Knowlton, 1939:126.

Apterous Summer Vivipara. Light green; cornicle, cauda, and appendages pale with tips of segments dark; tarsi black; rostrum, anal and genital plates and sometimes cauda, dusky. Body length 1-2.2; hind tibia .8-.9; antenna .9-1.1; rostrum hairy, attaining or slightly surpassing 2d coxa.

Alate Vivipara. Light green; mottled with dark olive-green with black lateral spots on abdominal I to VI inclusive and dusky dashes on segments VI, VII and VIII; rostrum, cornicle, cauda and anal and genital plates dusky; appendages brownish to black. Same in measurements as aptera except as follows: Antenna 1.2, secondary sensoria convex, hardly tuberculate. Hairs pointed, drooping; rather sparse on body. Cornicle cylindrical or slightly tapering, with distinct flange and imbricated. Cauda blunt, parallel-sided with slight neck, bearing 5-6 lateral hairs and a single dorsal preapical one. Lateral tubercles developed on prothorax and abdominal I and VII.

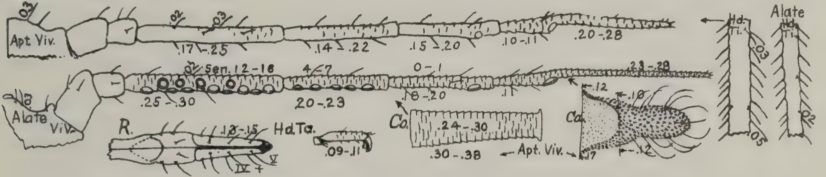

Fig. 176. *Aphis neomexicana*

Collections. On leaves and stems of *Ribes leptanthum* and *R. aureum* not curling leaves, on *Ribes inebrians* curling leaves tightly. Colorado: Fort Collins, Boulder, Hot Springs, Poudre Canyon and Rocky Mountain National Park. New Mexico: Las Vegas. Utah: Provo, Springville, Hooper, Plain City and Summit. Apterous summer viviparae May 25 to June 26, alate viviparae May 25 to July 8; apparently rare.

Cotypes. U.S.N.M.

Chief Distinguishing Characters. Length of cornicle (.24-.30 in alate vivipara equalling either III or unguis, in aptera .30-.33 about 1.5 times either III or unguis), hairs on cauda 6-7 lateral pairs, length of rostral IV+V (.13-.15) longer than hind tarsal II, and hairs sparse on antenna and not longer than diameter of III or of hind tibia.

This species is doubtfully distinct from *A. varians* which may be synonym of *A. oenotherae,* differing only as follows: Slightly shorter hairs on III and hind tibia (in *varians* never shorter and usually longer than diameter of segment bearing them), usual absence of sensoria on V in alate vivipara and not causing leaves to curl except on *Ribes inebrians.* The original description states the tibiae of the aptera to be "bristly." However, study of cotype specimens shows them to be decidedly less bristly than those of *A. varians.*

These points, however, need further biological investigation and host plant transfer tests to *Epilobium.*

Aphis nigragregalis Knowlton

Aphis nigragregalis **Knowlton, 1935c:137 and 1941b:44.**

Detailed description and drawings of this species seem to be unnecessary since it differs only slightly from *A. gregalis* and *A. ornata.* These differences according to Knowlton are as follows: Conspicuously black body, tinged with greenish or bluish in the alate vivipara, and slightly pruinose; mottled and banded in aptera; all appendages black, distortion of foliage (which is not recorded for *ornata)* and host plant (a different species of host from that for *ornata).*

Both *nigragregalis* and *ornata* are probably but variations of *A. gregalis.*

Collections. On *Chrysothamnus nauseosus* subsp. *nauseosus* and *C.* sp., attacking and distorting leaves and tender stems of twigs. Utah: Many localities in northern part of state and Upper Sigurd Creek. Apterous and alate summer viviparae June 21 to Sept. 2; not rare.

Cotypes. Knowlton Collection.

Aphis nyctalis Hottes and Frison

Aphis nyctalis **Hottes and Frison, 1931a:206; Palmer, 1936b:738.**

Apterous Summer Vivipara. **Head and thorax dark dusky brown; abdomen yellowish brown with greenish tinge especially laterally with dark patch just posterior to cornicle base"; appendages and rostrum brown; cauda, anal plate, genital plate and cornicle black. Body length 1.87-2; across eyes .47; antenna 1.14-1.60; hind tibia .90-1.05; rostrum attaining 3d coxa. Cornicle cylindrical to broadened at base. Cauda broadly tapering to approximately parallel-sided, bearing 4-5 or 6 pairs of lateral hairs. Hairs on body and appendages inconspicuous.**

Alate Vivipara. **"Head and thorax dark; abdomen yellowish brown to dark brown with lateral areas dark"; all appendages including rostrum and also anal and genital plates black. Body length 2; across eyes .46; antenna 1.30; hind tibia .90-1; rostrum attaining 3d coxa. Otherwise as in apterous vivipara except as figured.**

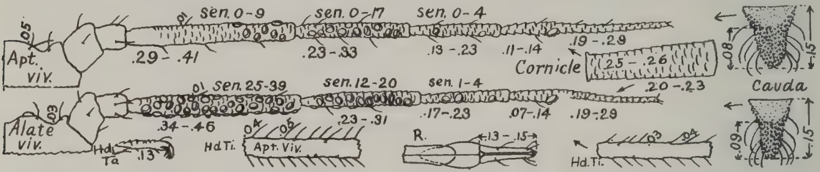

Fig. 177. *Aphis nyctalis*

Collections. On flower stalks of *Senecio uintahensis* and *S.* sp. Colorado: Mesa. Utah: Moab. Alate and apterous viviparae May 31 and in July; apparently rare.

Holotype. Ill. Nat. Hist. Surv., No. 10338. Paratypes No. 10340-10357 also Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Dark brown body and dark appendages, large number of large sensoria on III and IV and a few on V in alate vivipara and their usual presence on III, IV and V of apterous vivipara, short bushy cauda, and body length (not exceeding 2).

This species is very close to *A. lugentis;* indeed the limits of variation merge together so that further investigation may prove both to be but one species.

Data for color in life were taken from the description by Hottes and Frison.

Aphis oenotherae Oestlund

The Evening Primrose Aphid

Aphis oenotherae **Oestlund, 1887:62; Gillette, 1927:344 and 346.**
Aphis oenotherae **var.** ***rufa,*** **Gillette and Palmer, 1932b:424.**

Apterous Summer Vivipara. **Mottled olive-green to dark slate color, sometimes rusty yellow; pale brownish on head; with powdery reticulation; cornicle and appendages pale to slightly dusky distally; tarsi, cauda and anal and genital plates blackish. Body length 1.5-2; hind tibia .95; antenna 1-1.2; rostrum attaining 3d coxa.**

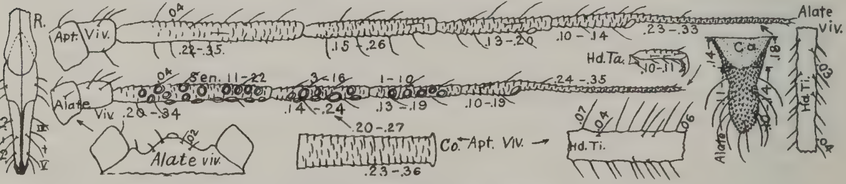

Fig. 178. *Aphis oenotherae*

Alate Vivipara. **Head and thorax black; abdomen grass-green, olive-green or dark slate color occasionally rusty yellow; with powdery reticulations; with lateral areas, spot behind cornicle, median dashes on abdominal IV to VIII blackish; cornicle pale to slightly dusky; antenna, cauda and anal plate dusky to blackish; tibiae pale to brownish, except tips and tarsi which are black. Same in measurements as aptera except as figured. Hairs pointed, drooping**

to nearly erect. Cauda elongated, nearly parallel-sided with slight neck, bearing 3 lateral and 3 dorsolateral hairs on each side. Lateral tubercles present.

Male. Alate. (Cleared and mounted on slide), head and thorax black; abdomen with lateral areas, spot posterior to base of each cornicle and short dorsal bands on all segments, especially posteriorly, dusky; antenna, cornicle and cauda blackish; legs blackish with most of tibiae brownish. Body length 1.50; antenna 1.20, III .22-.33, IV .18-.23, V .14-.21, VI .09-.12+.22-.29, sensoria thickly covering III, IV and V and usually a few on base of VI; cornicle .10.

Collections. On leaves and stems of *Epilobium angustifolia* and *Oenothera strigosa* and *O. caespitosa,* not curling leaves. Throughout region. Apterous and alate viviparae May 22 to Oct. 6, alate males Aug. 25 and Oct. 18; very common. Often found mingled with *Aphis oestlundi.*

Chief Distinguishing Characters. Number and presence of sensoria on III, IV and V of alate vivipara, bushy cauda with 5-6 pairs of lateral hairs and rather long erect tibial hairs (slightly exceeding diameter of tibia).

Cotypes. Univ. of Minn. Collection. Type of variety *rufa* Gillette, U.S.N.M., No. 41968; paratypes, Colo. Agr. Exp. Sta. Collection.

This aphid resembles very closely *A. epilobii* Kaltenbach but Gillette (op. cit.) after examination of mutilated specimens from Germany determined as the latter species still considered Oestlund's species as distinct. Specimens determined by Hille Ris Lambers as *A. epilobii* Kaltenbach seem identical with the Colorado form. Theobald's description (1927:111) appears to fit reasonably well though he reports presence of oviparae on *Epilobium* which have not been found here and do not fit in with the idea of these host plants as summer hosts only. Further study may prove *A. oenotherae* to be a synonym of *A. epilobii* Kaltenbach.

Aphis oestlundi Gillette

Aphis oenotherae Oestlund (misidentification), Oestlund, 1922:130.
Aphis oestlundi Gillette, 1927:345; Hottes and Frison, 1931a:208; Gillette and Palmer, 1932b:425.

Apterous Summer Vivipara. Light green; tarsi, tips of antenna, of tibiae and of cornicle dusky to blackish; cauda and anal plate pale to slightly dusky. Body length 1.8-2; antenna .80 (often five-segmented), rostrum attaining 3d coxa or abdomen.

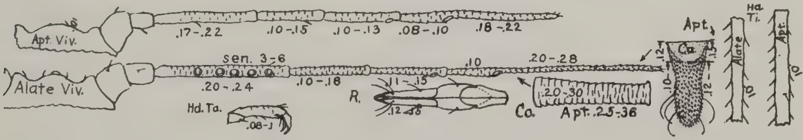

Fig. 179. *Aphis oestlundi*

Alate Vivipara. Head and thorax black; abdomen light green; with dusky lateral areas, spot at base of each cornicle posteriorly and sometimes traces of median dashes on abdomen; antenna and cornicle dusky; legs pale except tips of tibiae and tarsi which are black; cauda pale. Length of body 1.1-1.7; hind tibia .60; antenna .80-1. Hairs pointed, fine, sparse, drooping. Cauda somewhat elongated and constricted near base, bearing 2-3 hairs on each side. Lateral tubercles well developed on prothorax, and abdominal I and VII.

Collections. On leaves and stems of *Oenothera strigosa.* Colorado: Fort Collins, Boulder, Rocky Ford and Greeley. Idaho: Parma and Hansen. Utah: La Verkin. Apterous summer viviparae May 19 to July 22, alate viviparae May 29 to Sept. 10; very rare in this region, but abundant in occasional infestations.

Type. U.S.N.M., No. 41967. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Number of sensoria in alate vivipara (not more than 6 on III and none on IV and V), length of rostral IV+V (.11-.15 and attaining abdomen), number of hairs on the cauda (2-3 lateral pairs) and light grass-green body.

This species is very close to *A. gossypii;* indeed there seems to be no definite distinguishing character to which exceptions cannot be found. However, *oestlundi* can generally be distinguished by the following: Longer rostral IV+V (longer than .10-.11 and attaining beyond 3d coxa), smaller number and larger size of the sensoria on III (3-6 instead of usually 7-10) in alate vivipara, more uniform body color of *oestlundi* (lacking the mottling and variations, from dark green to yellow in different individuals) and absence of tessellation in the alatoid nymphs, common in *gossypii. A. oestlundi* on *Oenothera* though abundant in the east has been, during the time studied, very rare in Colorado in spite of the plentiful numbers of *gossypii.*

Aphis oregonensis Wilson

Aphis oregonensis **Wilson, 1915a:92; Gillette and Palmer, 1932b:426.**
Anuraphis oregonensis, **Gillette and Palmer, 1928:12.**

Apterous Summer Vivipara. **Dark brown to wine-red; with head, broad lateral portions of all segments, a pair of dorsolateral areas on metanotum and entire abdominal I covered with white reticulations; appendages mostly yellow; cornicle black. Body length 1.40-1.71; across eyes .40; hind tibia .55-.80; antenna 1.06-1.30. Hairs slightly longer than diameter of segment bearing them.**

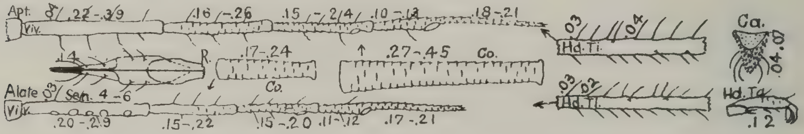

Fig. 180. *Aphis oregonensis*

Alate Vivipara. **Body length 1.20-1.70; hind tibia .55-.85; antenna 1-1.20, secondary sensoria flat; rostrum with tip beyond hairs needlelike in ventral aspect, attaining abdominal I. Hairs spinelike, rather sparse and inconspicuous. Cauda broadly tapering, blunt, shorter than hind tarsal II, bearing 3 hairs on each side. Lateral tubercles developed on prothorax and abdominal I and VII.**

Collections. On leaves and tender twigs of *Artemisia tridentata* and *A. ludoviciana* subsp. *typica.* Colorado: Sargent, Steamboat Springs and Manassa. Utah: Logan, Snowville, Brigham and Honeyville. Apterous summer viviparae May 15 to Aug. 11, alate viviparae May 17; apparently rather rare.

Type. U.S.N.M. Paratype, Granovsky Collection, No. 438.

For discussion on status of the species see *A. canae.*

Chief Distinguishing Characters. Brown body with reticulated pattern on aptera and long cornicle (.27-.45 in apterous, .17-.19 in alate vivipara).

*Aphis ornata (*Gillette and Palmer)

Anuraphis ornata **Gillette and Palmer, 1929a:3.**
Aphis ornata, **Gillette and Palmer, 1932b:427.**

Apterous Summer Vivipara. **Head and pronotum dusky; rest of body pale pinkish or flesh-color; marked by irregular dusky bands on all segments, coalescing on abdominal IV and V, and with dusky lateral areas; entire dorsum covered with faint white reticulations; appendages pale but dusky distally; cornicle, cauda and anal plate dusky to black. Body length 1.8; hind tibia .66-.70; antenna .80-.86; rostrum attaining 3d coxa. Hairs semierect; .02 on antenna; .03 on hind tibia, shorter than diameter of segment bearing them.**

Alate Vivipara. **Head and thorax dark brown to black; abdomen yellowish brown with dusky dashes on median and lateral areas of each segment; cauda and anal plate brownish to blackish; antenna blackish, except base of III; cornicle dusky; legs pale except femora, tarsi and tips of tibiae. Body length 1.5-1.9; hind tibia .66; antenna .90. Cornicle cylindrical, imbricated, without distinct flange. Cauda tapering, with acute point, bearing 4-5 hairs on each side. Lateral tubercles present, quite large on prothorax and abdominal I and VII. Hairs as in apterous vivipara.**

Ovipara. **Apterous. Body length 1.8; antenna .70; cauda .07; hind tibia slightly swollen along most of length and bearing 5-9 flat sensoria.**

Male. Apterous. Body length .85-.90; hind tibia .41; antenna .65-.70. Otherwise as in apterous vivipara.

Collections. On leaves and twigs of *Chrysothamnus graveolens, C. viscidiflorus* and *C. parryi* and *Ratibida columnaris,* but not recorded as noticeably distorting leaves. Colorado: Fort Collins, Denver, Bellvue, Antonito, Manassa, Axial, La Porte and Boulder. Apterous summer viviparae June 2 to Oct. 20, alate viviparae June 16 to Aug. 29, oviparae Oct. 11 to Nov. 8, males Oct. 20 and 22; rather common.

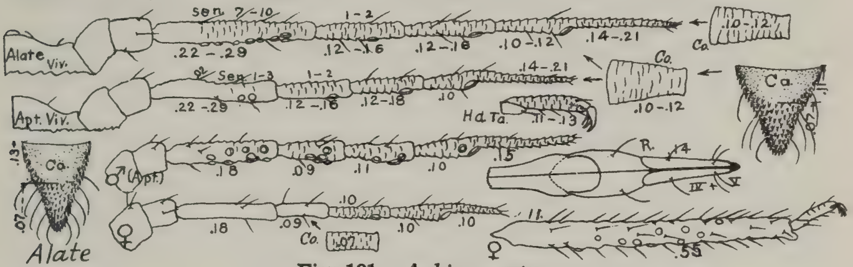

Fig. 181. *Aphis ornata*

Chief Distinguishing Characters. Pink body and dorsal dusky markings of the aptera, rather acutely tapering cauda with not more than 5 pairs of lateral hairs and short cornicle (shorter than unguis and shorter than the rather long rostral IV+V).

Type. U.S.N.M., No. 41454. Paratypes, Colo. Agr. Exp. Sta. Collection.

This species is very close to *A. gregalis.* The only differences noted are as follows: Pink body instead of green in apterous vivipara, longer unguis (.14-.21 instead of .11-.14). Furthermore, collections of *A. ornata* were all taken on eastern slope of the Rockies and on *Chrysothamnus graveolens* while *A. gregalis* have all been taken west of the Continental Divide and on *C. viscidiflorus.* Knowlton's species is reported to cause distortion of leaves while this has not been recorded for *ornata.*

Aphis pentstemonicola Gillette and Palmer

(Plate V, 1-7)

Aphis pentstemonicola Gillette and Palmer, 1929a:23 and 1932b:428.

Fundatrix. Pale green; dusky on head, dorsolateral portions of pronotum, lateral areas of all segments, patch posterior and mesad of each cornicle and slight dorsal dashes on abdominal VII and VIII and sometimes traces on VI. Body length 1.72; hind tibia .72; antenna 1, III and IV often coalesced. Otherwise as in apterous summer vivipara.

Alate Vivipara. Head and thorax black; otherwise color about as in summer apterous vivipara. Body length 1.80; hind tibia .75-.90; hind tarsal II .12; antenna 1.20*; rostrum attaining between 2d and 3d coxae.

Apterous Summer Vivipara. Young. Born of fundatrix. Pale green with head brownish. *Born of summer vivipara.* Pale green; brownish on head; with dark green spot on dorsum of abdomen. *Adult.* Light yellow or greenish yellow, mottled with darker green; marked with dusky on head, thorax, (broken on metanotum), lateral areas on all abdominal segments, a patch at base of each cornicle, and dorsal dashes on VI, VII and VIII; cornicle, antenna, cauda and anal and genital plates dark; legs pale to dusky, with tarsi and tips of tibiae blackish. Body length 1.8-2; hind tibia 1; hind tarsal II .12; antenna 1-1.3,* secondary sensoria

*The number of secondary sensoria and measurements seem to be unstable especially in the aptera, varying and intergrading sometimes in apparently the same colonies so that no distinctive specific line can be drawn. In extreme cases sensoria on III were absent or varying up to 18 and clustered at distal end. Antennal segments may be as short as .14-.19 for III, .12 for IV, .10-.12 for V, .08+.13 for VI. Alate viviparae taken with these apterae also showed fewer sensoria and shorter measurements as follows: III .20-.24, IV .14, V .13, VI .10+.19, sensoria 20-24 on III, 12 on IV, 5-7 on V. Possibly these are special life cycle forms if not another species.

convex but not tuberculate. Hairs pointed and fairly numerous to sparse, semierect; on tibia .03-.04. Cornicle cylindrical, coarsely imbricated and with flange. Cauda tapering, acute, with but slight tendency to constriction near base, bearing three hairs on each side. Lateral tubercles large on prothorax and abdominal I and VII. Anal plate slightly produced on ventral margin.

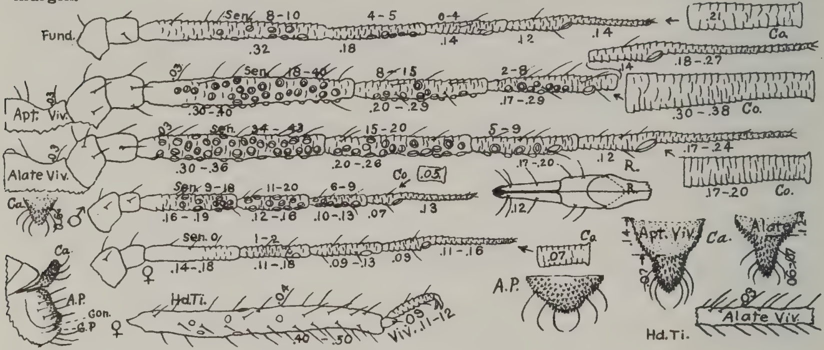

Fig. 182. *Aphis pentstemonicola*

Male. Apterous. Very dark olive-green; all appendages dark dusky brown to black. Body length 1.1; hind tibia .40; antenna .70.

Ovipara. Apterous. Brownish yellow, shading to dusky brown on head; abdomen mottled with dusky green; antenna dusky, darker distally; cornicle and cauda dusky; legs sordid white with tarsi and tips of tibiae and femora dusky to blackish. Body length 1.40, hind tibia .40-.50; antenna .80; cauda .10; hind tibia slightly swollen on proximal half and bearing about 6 large scattered sensoria.

Collections. On leaves and stems of *Penstemon* sp. Colorado: Fort Collins. Utah: Logan. Fundatrix Apr. 23, apterous summer viviparae May 4 to Oct. 20, alate viviparae May 1 to Oct. 20, males Oct. 19 and 20, oviparae Oct. 12 to 20; rather common.

Type. U.S.N.M., No. 41465. Paratypes, Colo. Agr. Exp. Sta. Collection.

This species is very close to *A. pentstemonis* Williams, but differs from cotypes of the latter, which were examined, as follows: Presence of rather numerous sensoria on IV and V in both alate and apterous viviparae (absent in *pentstemonis* except a few in a few specimens), shape of cauda which is less constricted, number of caudal hairs, only 3 on each side.

Aphis persicae-niger Smith

The Black Peach Aphid (Plate VII)

Aphis persicae-niger Smith (E.F.), 1890:101; Smith (J.B.), 1890, Bul. 72; Gillette, 1908d:308; Cutright, 1925:193 (life history); Gillette and Palmer, 1932b:430.

Early Spring Apterous Vivipara. Same as summer vivipara except as follows: antenna 1.10-1.25; unguis .17-.22, hardly more than half of III; hind tibia .80; cornicle .20.

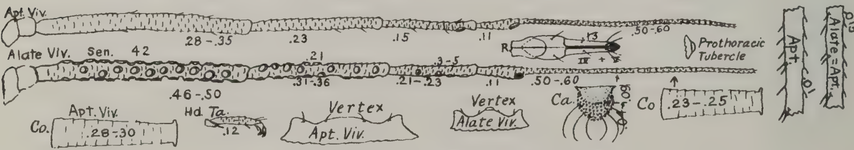

Fig. 183. *Aphis persicae-niger*

Alate Vivipara. Body length 1.60-1.80; hind tibia 1.10; hind tarsal II .12; antenna 1.60-1.75, secondary sensoria tuberculate; rostrum attaining between 2d and 3d coxae.

Apterous Summer Vivipara. Young. Newborn pale or lemon-yellow; in 2d instar salmon or amber color, later, dark yellowish brown, becoming black only in adult instar. ***Adult.*** Shining black, fading into brownish laterally and anteriorly; cornicle black; antenna dusky to black; cauda and legs yellowish to slightly dusky. Body length 1.80-2; other parts as in alate vivipara. Hairs pointed, drooping; .01 long on body and antennal III; .02-.03 long on hind tibia. Dorsal integument smooth. Cauda rarely longer than broad, rounded, wartlike with slight neck, bearing three curved bristles or hairs on either side. Lateral tubercles vestigial.

Collections. On bark of twigs and branches of peach *(Prunus persica)* and on roots of young trees shipped in. Colorado: Fremont, Delta, and Mesa counties. Utah: Brigham, Provo, Perry, Orem, Spanish Fork and Farmington. Idaho: Declo and Twin Falls. Apterous viviparae Mar. 13 to June 22 and Oct. 24, alate viviparae Mar. 29 to June 27, also Dec. 29; not common.

Chief Distinguishing Characters. Shining black to brownish body, short wartlike cauda, length of antenna (as long as body), tuberculate sensoria and their presence and number on III, IV and V of alate vivipara (40 or more on III and 20 or more on IV) and habitat on bark of branches and roots.

Aphis phaceliae Gillette and Palmer

(Plate V, 8-11)

Aphis phaceliae **Gillette and Palmer, 1929a:26 and 1932b:430.**

Fundatrix. **Color same as summer aptera or with more mottling of green, but pale posteriorly to abdominal IV. Body length 1.76; antenna .70, III and IV coalesced; hind tibia .70; cauda .12 on side.**

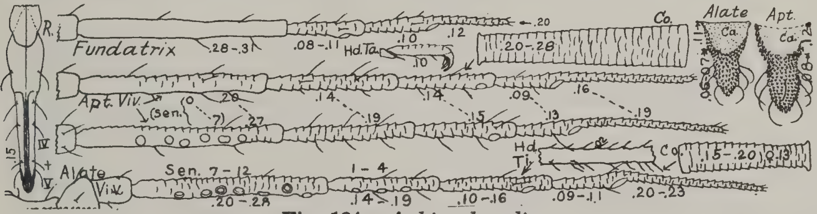

Fig. 184. *Aphis phaceliae*

Alate Vivipara. **Head and thorax black; abdomen pale apple-green with dorsal dashes and median line darker green and with dusky lateral patches anterior to cornicles and at bases of cornicles, also with slight median dashes or bands posterior to cornicles; entire antenna, cornicle, tarsi, and tips of tibiae black; cauda yellowish; anal and genital plates dusky. Body length 1.20-1.33; hind tibia .66-.80; antenna .83-1, secondary sensoria not tuberculate; rostrum attaining abdominal II.**

Apterous Summer Vivipara. **Head pale rusty yellow; rest of body pale yellowish green or canary-yellow mottled with bluish green anterior to abdominal IV; cauda pale yellow; cornicle black; legs pale with tarsi and tips of tibiae blackish; antenna pale. Same in measurements as alata except as figured. Hairs pointed, drooping, .02-.03 long on body and antenna. Cauda elongate, parallel-sided, with slight constriction or neck near base, bearing 3 hairs on each side. Lateral tubercles present on prothorax and abdominal I and VII.**

Ovipara. **Apterous. Color same as apterous vivipara except for large pale areas where eggs show through body wall and hind tibia which is brownish, slightly swollen on proximal half.**

Collections. On leaves and stems of *Phacelia* sp. Colorado: Fort Collins, Bellvue and Boulder. Fundatrix April 15, apterous summer viviparae June 1 and 7 and Sept. 22, alate viviparae May 16 to June 7, oviparae Sept. 22; not common.

Type. U.S.N.M., No. 41466. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Length of rostral IV+V (.15), 2d fork of media of fore wing (arising at half, often more, of distance from margin of wing to 1st fork), number of sensoria (7-12) on III of alate vivipara, constancy of sensoria on IV in alate vivipara, length of cauda (on median line shorter than hind tarsal II), length of rostrum (attaining abdominal II), and presence of sensoria occasionally on III of the apterous vivipara.

Aphis pilosicauda Gillette and Palmer

Aphis pilosicauda **Gillette and Palmer, 1932a:141 and 1932b:432.**

Alate Vivipara. **Head and thorax black; abdomen olive-green; lateral areas dusky; cauda, cornicle and antenna dusky to black; legs dusky. Body length 1.5-1.9; hind tibia .65-.80; hind tarsal II .11; antenna .80-1.05, secondary sensoria flat; rostrum obtuse, IV+V rather slender, attaining abdominal I.**

Apterous Summer Vivipara. **Olive-green; slightly powdery; cornicle dusky to blackish; tibiae yellow with tips black; tarsi black; antenna pale with terminal segments dusky. Dorsal surface of body reticulated. Same in measurements as alata except as figured and rostrum attaining abdominal I or II. Hairs pointed, fine, sparse. Cornicle cylindrical, rather slender, about as wide as hind tibia, imbricated and with flange. Cauda blunt, tapering to cylindrical, slightly longer than wide, bearing about 8 hairs on each side. Lateral tubercles present on prothorax and abdominal I and VII.**

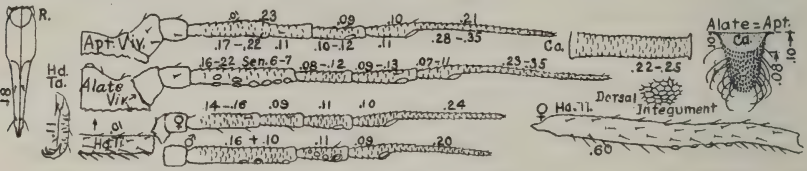

Fig. 185. *Aphis pilosicauda*

Ovipara. **Apterous. Color same as apterous vivipara except color of hind tibia which is brownish. Body length 1.80; hind tibia .53-.60; antenna .80, III and IV nearly coalesced; hind tibia very slightly swollen in middle and bearing about 1-4 hardly visible sensoria.**

Male. **Apterous. Color same as in apterous vivipara. Body length 1.20; hind tibia .53; antenna .70-.75, III and IV sometimes coalesced; cornicle .15; rostral IV+V .12 long, attaining middle of abdomen.**

Collections. On stems of *Cirsium* sp., near ground or on roots. Colorado: Fort Collins and Boulder. Apterous summer viviparae June 19 to Sept. 18, alate viviparae June 11 to July 18, oviparae Oct. 4 to 30, males Oct. 30; not abundant.

Type. U.S.N.M., No. 43845. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Short, bluntly tapering bushy cauda, rather short antenna (hardly longer than 1), few sensoria (6-7) on III of alate vivipara, length of unguis (longer than III) and dark green body, without dorsal patch.

Aphis pomi DeGeer

The Apple Aphid (Plate VI)

Aphis pomi **De Geer, 1773:53; Gillette, 1908d:303; Gillette and Taylor, 1908:23; Baker and Turner, 1916c:955; Matheson, 1919:686; Patch, 1923a:45 and 1929:698; Theobald, 1927:133; Gillette and Palmer, 1932b:433.**

Aphis mali **Fabricius, 1794:216; Smith (J.B.), 1900:3.**

Fundatrix. Young. **Newly hatched, very dark green; cornicle very short, shorter than antennal I and black. Body length .60, antenna .28.** ***Adult.*** **Yellowish apple-green, head dusky brown; tip of antenna, cornicle, cauda, anal plate, genital plate, tip of rostrum, tarsi and tips of tibiae black to blackish; remainder of appendages slightly dusky. Body length 1.50; antenna .75, III and V coalesced. Otherwise as in summer apterous vivipara.**

Alate Vivipara. **Head and thorax black; abdomen light yellowish green or apple-green, rarely lemon-yellow; with darker green spots laterally but not true dusky areas; cauda, and appendages pale or slightly dusky; tarsi, tips of tibiae and of antennal III, IV and V and entire VI, cornicle, cauda and anal and genital plates blackish. Body length 1.50-1.90; hind tibia 1; antenna 1.15-1.30; rostrum obtuse, attaining between 2d and 3d coxae.**

Apterous Vivipara. Young. **First instar, very pale yellowish green.** ***Adult.*** **Same as alate vivipara except as follows: Head, thorax and lateral abdomen yellowish green. Hairs pointed, drooping; .04 long on body and .02 on antennal III; on hind tibia, length equalling or slightly exceeding diameter of tibia. Cauda elongated-cylindrical, with only slight tendency to constriction near base and blunt at tip, bearing 4 lateral and 3 dorsolateral hairs on each side and a median preapical pair near tip. Lateral tubercles present on prothorax and all abdominal segments except VIII.**

Ovipara. Apterous. Usually dull green with tinge of rusty yellow to yellowish olive-brown; head light to dark dusky brown; cornicle, cauda, anal and genital plates, tarsi, knees, distal ends of tibiae and distal half of antenna black or blackish. Body length 1.40-1.50; antenna .85-1.0; hind tibia hardly swollen and bearing only about 10 large sensoria scattered along entire length.

Male. Apterous.* Brownish yellow with head dusky brown; dark markings as in ovipara. Body length 1.10; antenna .90; cornicle .15.

Egg. Newly laid, light green; later, shiny black. Size .60 by .26.

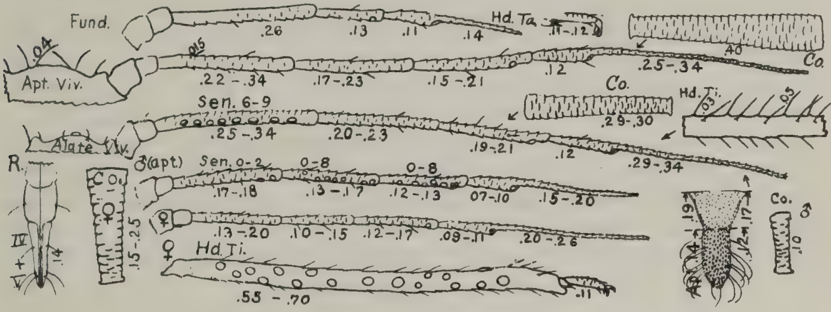

Fig. 186. *Aphis pomi*

Collections. On leaves and twigs of thorn apple *(Crataegus* sp.), apple *(Malus* sp.), pear *(Pyrus communis), Pyrus scopulina,* and *Sorbus* sp., causing loose curling of leaves. Throughout region. Fundatrices March 18 to April 28, apterous summer viviparae May 22 to Sept. 28, alate viviparae April 22 to Sept. 1, sexuales Sept. 16 to Oct. 20; eggs scattered over bark of twigs, hatching several days before buds open; very common and causing considerable damage.

Chief Distinguishing Characters. Body apple-green occasionally yellowish to orange-yellow with black cornicles, number of sensoria (6-9) on III of alate vivipara, bushy cauda (6-7 hairs on each side), length of cornicle (.30-.40), rather long rostral IV+V (.14), rather long unguis (about the same length as III and cornicle) and slender hind tibia of the ovipara which bears only a few sensoria scattered over entire length.

Aphis pseudohederae Theobald

Aphis hederae Kaltenbach (misidentification), Essig, 1910:335.
Aphis pseudohederae Theobald, 1927:196.

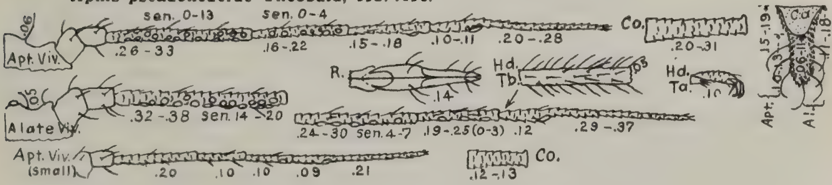

Fig. 187. *Aphis pseudohederae*

Apterous Summer Vivipara. Dark maroon-brown; antennal I and II, terminal segments of rostrum, cauda, anal and genital plates, coxae, trochanters, distal part of femora, knees, tips of tibiae and tarsi black. Body length 1.5-2; across eyes .38; antenna 1-1.25; hind tibia .70-.85; rostrum attaining abdominal I. Hairs rather long; .06 on vertex; .04-.05 on hind tibia (diameter of tibia .03). Cornicle cylindrical or wider at base; cauda spatulate, bearing 3-4 pairs of lateral hairs.

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*Label "Alate male" in Gillette 1908d Plate 6, Fig. 4 and Gillette and Taylor, 1908a:58 should read "apterous male."

Alate Vivipara. **Head and thorax black; abdomen dark brown often with reddish tinge; in cleared specimens showing dark lateral areas, dorsal bands on abdominal VI and VII, and venter of I; anal and genital plates and cauda black; antenna, cornicle, rostral III and IV+V, coxae, trochanters, tarsi and tips of tibiae blackish. Body length 1.5-2; across eyes .40; antenna 1.3-1.50 (in fall form 1.); hind tibia .85-1; rostrum attaining or surpassing 3d coxa. Hairs on antenna .02; on hind tibia .04-.05, exceeding in length the diameter of tibia. Cauda spatulate bearing 4-5 pairs of lateral hairs.**

Fall forms were smaller but agreed in all other characters.

Collections. On leaves of *Hedera helix.* Colorado: Fort Collins. Utah: Logan. Alate viviparae June 5, Sept. 22 and small examples Oct. 17 and 25, apterous viviparae June 5 to Sept. 22; rare.

Chief Distinguishing Characters. Dark body with tinge of maroon, long rostral IV+V (.13-.15 attaining 3d coxa or abdomen), presence of sensoria on IV and often on V in alate vivipara and frequently on III in aptera, number of hairs on cauda (3-5) and short hind tarsal II (.10, shorter than rostral IV+V).

This species is close and perhaps doubtfully separated from *A. hederae* Kaltenbach but differs as follows: Frequent presence of sensoria on III in apterous vivipara, length of rostrum, attaining or surpassing 2d coxa, maroon color of body and length of unguis (not exceeding III).

Aphis pseudovalerianae Gillette and Palmer

Aphis pseudovalerianae **Gillette and Palmer, 1932a:143 and 1932b:434.**

Alate Vivipara. **Head and thorax brown to black; abdomen light olive-green; with dusky lateral areas and on terminal segments dorsal bands; cauda, cornicle, and appendages brown to black. Body length 1.5-1.8; hind tibia .80; antenna 1.05-1.30, secondary sensoria rather small, slightly convex, hardly tuberculate; rostrum obtuse, attaining 3d coxa.**

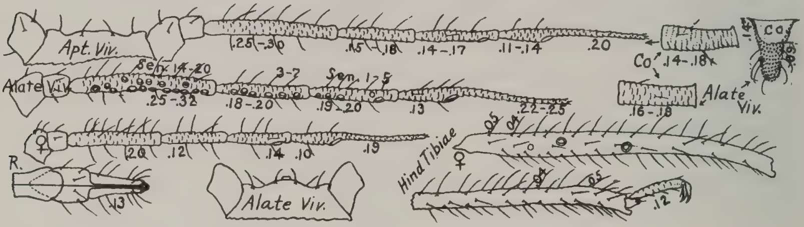

Fig. 188. *Aphis pseudovalerianae*

Apterous Summer Vivipara. **Head brown; thorax dusky green; abdomen light olive-green, with slightly dusky lateral areas anterior to cornicles and dorsal dashes on VII and VIII; cauda and cornicle black; legs brown with tarsi and tips of tibiae black; antenna brown to black. Same in measurements as alata except rostrum which attains abdominal I. Hairs pointed, numerous, erect. Cornicle cylindrical, with flange, imbricated, bearing 2-4 hairs on proximal half. Cauda parallel-sided, broad and obtuse, with about 5 hairs on each side. Lateral tubercles present and large on pronotum and abdominal I and VII.**

Ovipara. **Apterous. Head and prothorax brownish; abdomen yellowish olive-green; otherwise color as in summer aptera. Body 1.50; hind tibia .75; antenna .85; cornicle .13. Hind tibia very slightly swollen and bearing 2-3 irregular-sized faint sensoria.**

Collections. On root of *Valeriana* sp. Colorado: Log Cabin (west of Livermore) and Fort Collins. Apterous and alate summer viviparae July 11 to Aug. 2, oviparae Sept. 7 and 10; apparently rare.

Type. U.S.N.M., No. 43843. Paratypes, Colo. Agr. Exp. Sta. Collection.

This species differs from *A. valerianae* as follows: Longer, erect hairs, presence of hairs on cornicle, lighter color of body, shorter antenna and cornicle and shape of sensoria on antenna (not tuberculate).

Aphis ribiensis Gillette and Palmer

Aphis ribiensis Gillette and Palmer, 1929a:20 and 1932b:435; Allen and Knowlton, 1939:126.

Fundatrix. Pale to medium yellowish green or apple-green; cornicle and cauda nearly colorless; tibiae pale to slightly dusky at tips; antenna pale with dusky tip. Body 1.90-1.10; hind tibia .55; antenna .54, III and IV coalesced; cauda .14 on side. Otherwise as in summer aptera.

Alate Vivipara. Alatoid Nymph. Head slightly dusky; thorax very pale yellow; abdomen yellowish green, some individuals with distinct mottling; cornicle colorless; wing-pads black. *Adult.* Head and thorax black; abdomen yellowish green; rostrum and antenna dusky, lighter on proximal part of III; tibiae pale yellowish with tips black; cornicle pale; cauda pale to slightly dusky; anal and genital plates dusky. Body length 1.90; hind tibia .85; hind tarsal II .10; antenna .95; rostrum obtuse, hardly attaining 2d coxa. Hairs pointed, drooping; on hind tibia moderately numerous. Cauda elongate, blunt and with slight neck and bearing 2-3 pairs of lateral hairs. Lateral tubercles present.

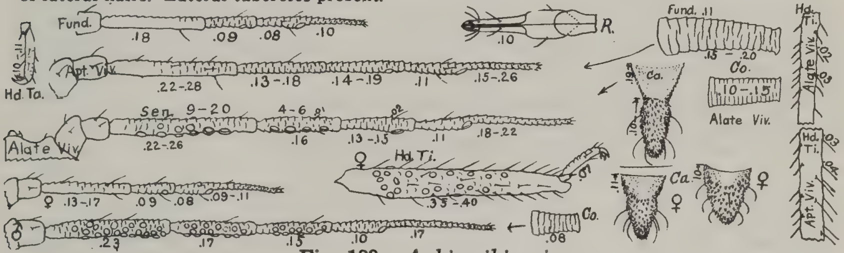

Fig. 189. *Aphis ribiensis*

Apterous Vivipara. Same color as fundatrix; measurements same as alata except as follows: Body length 2-2.14. Hairs on body .04, very sparse.

Ovipara. Apterous. Color same as summer aptera. Body length 1.55; hind tibia .40; antenna .55; hind tibia moderately swollen and bearing about 20 large sensoria scattered over proximal two-thirds of length.

Male. Alate. Head and thorax black; abdomen dusky dark green; antenna black or blackish throughout; cornicle and cauda dusky; tibiae pale with tips black. Body length 1.33; hind tibia .65; antenna .85.

Egg. Newly-laid, greenish yellow; later, shining black.

Collections. On leaves and stems of *Ribes aureum* and *R. inerme,* curling leaves. Colorado: Fort Collins and Pingree Park. Utah: Mount Timpanogos, Richmond, West Point and Willard. Fundatrix May 26, apterous summer viviparae May 26 to July 24, alate viviparae May 31 and Aug. 25 to Nov. 9, sexuales Oct. 11 to Nov. 9; not abundant. Apparently leaving *Ribes* early, perhaps for summer host, and appearing again on the *Ribes* in the fall.

Type. U.S.N.M., No. 41463. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Number of sensoria (8-20) on III of alate vivipara, length of cornicle (.10-.15 long) in alate vivipara, number of hairs (3 pairs) on cauda, size of body (1.9-2.14 long) and pale cornicle.

From *A. nasturtii* this species seems to show no distinguishing characters; however, since no host transfer tests have been done the two species will be held distinct for the present.

Aphis ribi-gillettei Allen and Knowlton

Aphis ribi-gillettei Allen and Knowlton, 1939:128.

Apterous Summer Vivipara. Light green; cornicle and cauda pale; tips of appendages dusky. Body length .90-1.30; hind tibia .56-.60-".69"; tarsal II .08; antenna .71-.80; rostrum attaining abdomen.

Alate Vivipara. Pale green; antenna and tips of tibiae blackish; cauda, anal and genital plates and cornicle pale to slightly dusky. Body length .90-1.50; hind tibia .50-.70; hind tarsal II .07; antenna .70-.94; rostrum attaining 3d coxa.

Collections. On currant and gooseberry (*Ribes* sp.), curling terminal leaves. Utah: Eastern shore of Great Salt Lake. Alate and apterous summer viviparae July 6 to 15, Aug. 30 and Sept. 8.

Type. Knowlton Collection. Paratypes, Knowlton and Colo. Agr. Exp. Sta. Collections.

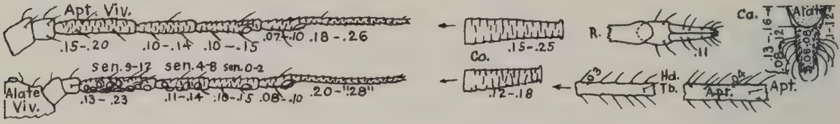

Fig. 190. *Aphis ribi-gillettei*

Chief Distinguishing Characters. Shortness of III (shorter than unguis), small size of the body (less than 1.5 in length), short rostral IV+V (.10-.12), together with long rostrum (reaching 3d coxa in alata and abdomen in aptera) and usual presence of sensoria on V in alate vivipara.

Aphis rociadae Cockerell

The Russet-colored Larkspur Aphid

Aphis rociadae Cockerell, 1903c:115; Davis, 1919:228 (in part—sexuales belong to another species); Gillette and Palmer, 1932b:436.

Alate Vivipara. Same color as aptera except as follows: Head and thorax dark brown and abdomen with dusky lateral areas anterior to cornicles and dorsal bands on segments IV to VIII; tibiae brownish with tips darker; antenna dusky to blackish; cornicle and cauda dark brown. Body length 1.80-2; hind tibia 1.15-1.30; hind tarsal II .13; antenna 1.45-1.70, secondary sensoria flat, antenna slightly swollen about sensoria. Hairs blunt or slightly capitate; .03-.04 long on body and hind tibia, neither sparse nor numerous. Cornicle cylindrical or slightly tapering with distinct flange, smooth. Cauda short, nearly as broad as long, parallel-sided with rounded tip, bearing 3 lateral and 2 dorsolateral pairs of hairs. Anal plate with median wartlike protuberance; both cauda and anal plate retracted under terminal segments of abdomen. Lateral tubercles not apparent. Rostral IV+V moderately slender, attaining between 2d and 3d coxae.

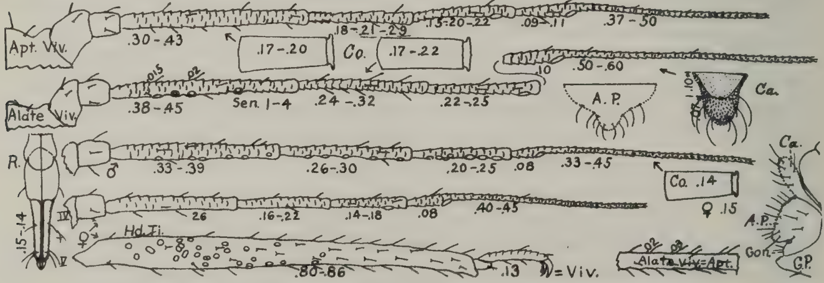

Fig. 191. *Aphis rociadae*

Apterous Summer Vivipara. Nymph. Coral red. ***Adult.*** Reddish brown or russet to black, fading to hazel anteriorly and posteriorly; shining; cauda, cornicle, appendages yellowish to pale brownish distally. Size of body 2 by 1.20; hind tibia 1; antenna 1.30-1.60. Otherwise as in alate vivipara except as figured.

Ovipara. Apterous. Dark brown, lighter on head and behind cornicles; cornicle dark brown; tibiae brownish with tips dark. Body length 2; antenna 1.15; hind tibia .85, slightly swollen in proximal half and bearing scattered flat sensoria.

Male. Apterous. Head blackish; rest of body yellowish brown, shining; with black lateral areas and dorsal spots; antenna, cornicle, anal plate, tarsi and tips of tibiae blackish; tibiae brown. Body length 1.35; hind tibia .85; antenna 1.30-1.50.

Collections. On leaves and stems of *Delphinium occidentalis* and sp., curling leaves tightly. Colorado: Denver, Pueblo, Colorado Springs and Fort

Collins. New Mexico: Rociada. Apterous summer viviparae May 14 to June 23 and Sept. 2, alate viviparae May 14 to June 21, sexuales Oct. 3*; quite common and troublesome.

Cotypes. U.S.N.M.

Chief Distinguishing Characters. Short blunt cauda, retracted tip of abdomen, median protuberance on anal plate, smooth cornicle, flat and inconspicuous sensoria few in number, bright red nymph and effect on the host (causing tightly curled leaves).

Aphis roripae (Palmer) n. comb.

The Yellow Cress Aphid

Cerosipha roripae Palmer, 1938:354.

Apterous Summer Vivipara. Pale to medium green; anal plate, cauda, rostrum and appendages brownish; cornicle pale. Body length 1.2-1.8; across eyes .35-.40; antenna 1.10, five-segmented; hind tibia .75-.95; rostrum attaining between 2d and 3d coxae. Hairs pointed, nearly erect and rather numerous on hind tibia; .05 and sparse on body. Cornicle cylindrical or slightly broadened at base, with very slight flange; cauda broad, parallel-sided, bearing 4 lateral pairs of hairs.

Alate Vivipara. Head and thorax dark; abdomen pale to medium green; appendages, anal plate, cauda and rostrum brownish; cornicle pale. Body length 1.50-1.60; across eyes .40; antenna 1.15; hind tibia .85-1; rostrum attaining 2d coxa. Hairs nearly erect. Otherwise as in apterous vivipara except as figured.

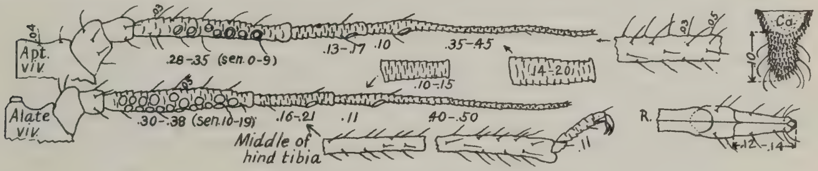

Fig. 192. *Aphis roripae*

Collections. On stems and leaves of Yellow Cress *(Roripa hispida).* Colorado: Glenn Haven (near Estes Park). Alate and apterous viviparae June 21; apparently rare but abundant where found. (Host rarely observed.)

Type. U.S.N.M., No. 52351. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Five-segmented antenna, relatively short cornicle (less than half III), long unguis (longer than III) and the usual presence of sensoria on III of apterous vivipara.

Aphis rosea (Baker)

The Rosy Apple Aphid (Plate VI)

Aphis sorbi Kaltenbach (misidentification), Sanderson, 1902:149; Simulyan, 1916:7.
Aphis pyri Boyer de Fonscolombe (misidentification), Gillette and Taylor, 1908:31.
Aphis malifoliae Fitch (misidentification), Baker and Turner, 1916d:325; Smulyan, 1918:20.
Anuraphis rosea Baker, 1921a:95; Theobald, 1927:294.
Aphis rosea, Gillette and Palmer, 1932b:437.

Fundatrix. Head black; rest of body rose-pink to very dark green to purplish brown or almost black with tinge of orange-red on abdominal VI and short dusky dashes in VII and VIII; covered with slight powder; femora and tibiae black distally; antenna blackish except base of III; cornicle and cauda black. Size 2.50 by 1.75; hind tibia .90; antenna 1.30; cornicle .30. Otherwise same as summer aptera.

Apterous Summer Vivipara. Amber to salmon or rose-pink to rosy brown to dark green; base of each cornicle often with reddish or dusky spot which may unite to form a band; covered with slight pulverulence which gives a purplish tinge. Size 2.25 by 1.50; hind tibia 1; antenna 1.85; rostrum obtuse, IV+V slender, attaining between 2d and 3d coxae. A pair of dorsal tubercles on head and abdominal VII and VIII. ***Young.*** First instar, pale yellow; later, purplish, with orange-yellow cornicles and band of same color between cornicles; legs pale with tarsi black; antenna pale on proximal half, blackish on distal half.

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*Hottes and Frison (1931a:214) report oviparae May 13.

Alate Vivipara. **Head and thorax shining black; abdomen rusty brown or dark green with dark dorsal patch and lateral areas; antenna, cornicle and cauda dark; tibiae amber color with tips black; tarsi black. Body length 1.8-2; hind tibia 1.2; hind tarsal II .10; antenna 2, secondary sensoria tuberculate; rostrum not surpassing 2d coxa. Vertex convex; antennal tubercles produced on medial margin, twice as much as vertex, bearing slightly capitate hairs. Antenna finely imbricated. Hairs inconspicuous, blunt or capitate; .02 long on hind tibia. Cornicle imbricated, cylindrical or slightly curved outward distally and with flange. Cauda very short, hardly apparent, tapering, acute, bearing 3 pairs of lateral hairs; anal plate with slight median protuberance. Lateral tubercles well developed, a pair of dorsal tubercles on head and abdominal VII and VIII. These dorsal tubercles are often apparently missing, especially in fall migrants. Surface of dorsum smooth.**

Male. **Alate. Same as alate vivipara, especially fall migrant except dorsal patch which is more broken into bands.**

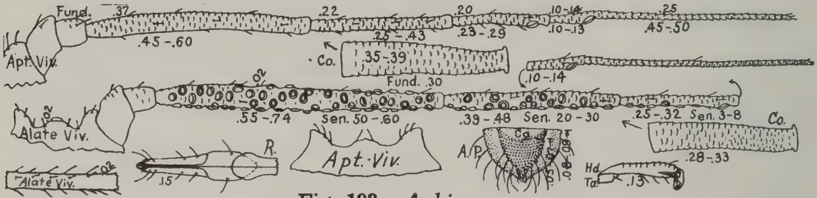

Fig. 193. *Aphis rosea*

Collections. On leaves and twigs of winter hosts, apple *(Malus* sp.), pear *(Pyrus communis),* and quince *(Cydonia* sp.), tightly curling leaves.* Colorado: Fort Collins and on the western slope of Rocky Mountains. Utah: Tooele, Provo, Farmington, West Jordan, Orem, Hobble Creek and Salt Lake City. Idaho: Wendell, Twin Falls and Filer. Fundatrices April 6 to May 8, apterous summer viviparae May 20 to July 23 and Sept. 20, alate viviparae April 27 to July 24 and Sept. 17 to Oct. 21, alate males Oct. 30 to Nov. 7; abundant in Colorado on western slope, not recorded as abundant or injurious east of the Divide in Colorado.

This aphid causes serious economic losses where abundant, by badly curling leaves, stunting twigs and pitting, deforming and stunting fruit.

Cotypes. U.S.N.M.

Chief Distinguishing Characters. Short, acute, cauda with only 3 pairs of lateral hairs, long somewhat curved cornicle, long antenna (about same as body length) with numerous tuberculate sensoria, dorsal tubercles often present, purplish or reddish body and effect on the host plant (tight curling of leaves and deforming of fruit).

Aphis rubicola Oestlund

Aphis rubicola **Oestlund, 1887:60; Winter, 1929:193; Hottes and Frison, 1931a:215; Gillette and Palmer, 1932b:438.**

Alate Vivipara. **Head and thorax dark; abdomen greenish or yellowish; legs pale with tips of tibiae blackish; antenna, cornicle, tarsi and cauda dusky to blackish. Body length 1.20-1.50; hind tibia .72-.85; antenna .85-1; rostrum obtuse, IV+V slender, attaining between 2d and 3d coxae. Hairs pointed, .015-.02 on antennal III; .03 on hind tibia. Cornicle approximately cylindrical, narrower in middle, with slight tendency to swelling in distal half and with slight flange, imbricated rather coarsely. Cauda elongate-tapering, rounded at tip with slight tendency to constriction near base, bearing 5 or 6 pairs of lateral hairs. Lateral tubercles present, quite large on prothorax and abdominal VII.**

Apterous Vivipara. **Pale yellowish green; appendages colorless, except tips of segments and entire tarsi which are dusky. Body length 1-1.10; hind tibia .50-.80; antenna .65-.85, III .18-.23, IV .11-.13, V .11-.13, VI .09-.10+.18-.23; cornicle .21. Otherwise as in alate vivipara.**

******Plantago lanceolata*** **has been found to be the summer host by Ross (1915:23), Baker and Turner (op. cit.) and other workers. This has not been verified in this region though this species of plantain was plentiful in infested apple orchards and the aphids left the apple trees in late July and considerable searching of the plantain was done in the field. No transfer tests were attempted.**

Collections. On leaves and tips of black raspberry *(Rubus occidentalis)* and red raspberry *(Rubus strigosus).* Colorado: Fort Collins, Boulder and San Luis Valley. Utah: Eden, Hooper, Lake View, Huntsville, Pleasant Grove and Logan. Idaho: Twin Falls and Riverside. Apterous viviparae June 13 to Aug. 7, alate viviparae June 17 to July 1; not common.

Cotypes: Univ. of Minn. Collection.

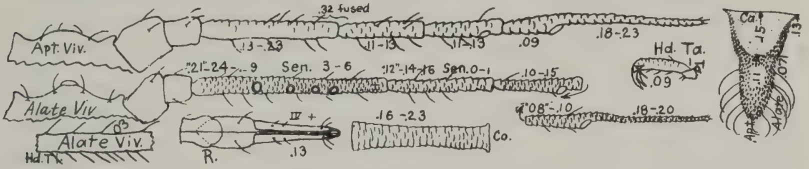

Fig. 194. *Aphis rubicola*

Chief Distinguishing Characters. Small size (not larger than 1.5), rather short bushy cauda (5-6 pairs of hairs), shape of the cornicle (usually narrowed in middle), and six-segmented antenna. The latter character distinguishes this species from *A. rubifolii.*

Aphis rubifolii (Thomas) n. comb.

Sipha rubifolii Thomas, 1879:121.
Cerosipha rubifolii, Winter, 1929:193; Gillette and Palmer, 1932b:470.

Apterous Summer Vivipara. Pale greenish yellow; cauda, cornicle and legs pale. Body length 1.2; hind tibia .45-.50; antenna, III and IV coalesced, .50-.60; III and IV not perfectly coalesced, .90; rostrum attaining between 2d and 3d coxae. Hairs pointed. Cornicle cylindrical or slightly tapering, with flange and imbricated. Cauda short, parallel-sided, bluntly rounded, sometimes silghtly constricted, bearing 3-4 pairs of lateral hairs and 2 mediodorsal ones.

Ovipara. Apterous. Pale orange-yellow; antenna, cornicle, cauda and legs colorless unless tips of tarsi dark. Body length 1.54; antenna .55-.60; cornicle .15; hind tibia .52, very slightly swollen and bearing 0 to 12 faint, nearly flat, sensoria along basal three-fourths of length.

Male. Apterous. Body length about .70; hind tibia .33; antenna .48, III and IV coalesced; cornicle .10.

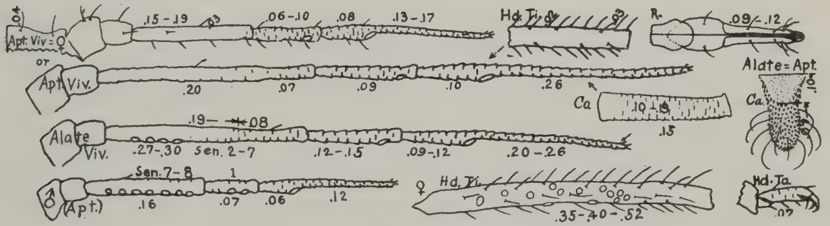

Fig. 195. *Aphis rubifolii*

Collections. On leaves of red raspberry *(Rubus strigosus). Colorado:* Fort Collins, Cherokee Park and Poudre Canyon. Utah: Clearfield, Eden, Ogden, Farmington, Layton and Logan. Idaho: Twin Falls. Apterous viviparae June 4 to Oct. 25, oviparae Sept. 24 to Nov. 2, males Nov. 2; apparently rare.

Neotypes. Ill. Nat. Hist. Surv. Collection, No. 4425.

Chief Distinguishing Characters. Small size, pale yellowish body, short bushy cauda, few sensoria on III of alate vivipara (not more than 7), character of hind tibia of ovipara (slightly swollen and bearing scattered, rather large, sensoria) and five-segmented antenna. The latter character separates this form from *A. rubicola.*

Figure of antenna of alate vivipara drawn from specimens collected in Illinois and determined by Hottes.

Aphis rumicis Linnaeus

The Dock Aphid

Aphis rumicis Linnaeus, 1758:451; Gillette, 1908c:178 and 180; Borner and Janisch, 1922:65; Hille Ris Lambers, 1934:27; Jones (M.G.), 1942:167; Jacob, 1945:102.
Aphis carbocolor Gillette, 1907:391; Gillette and Palmer, 1932b:386.

Fundatrix. Dull slaty black throughout except proximal half of antennal III, 1st femur, middle portion of all tibiae and proximal portion of rostrum. Body length 1.95; antenna .90, III and IV coalesced; cornicle .14. Otherwise as in summer aptera.

Apterous Summer Vivipara. Deep, dull, sooty-black throughout; appendages and rostrum mostly yellowish, blackish at distal ends of segments and entire tarsi. Body length 2.1-2.5; hind tibia 1; antenna 1.1-1.3. Dorsum of body reticulated.

Alate Vivipara. Color same as apterous vivipara except that dorsum is polished. Body length 1.9; hind tibia 1; hind tarsal II .13; antenna 1.3, secondary sensoria flat; rostrum attaining 2d coxa. Hairs pointed, fine; on body very sparse. Cornicle cylindrical, finely imbricated, and without flange. Lateral tubercles well developed on prothorax and all abdominal segments. Cauda broadly cylindrical, with slight neck, blunt, bearing about 7 pairs of lateral hairs.

Ovipara. Apterous. Color same as apterous vivipara. Body 1.9 long; antenna barely 1; hind tibia .83, proximal two-thirds slightly swollen and bearing about 10 small sensoria.

Male. Apterous. Color same as females or a little lighter. Length of body 1.30; antenna .94; cornicle .11.

Egg. Newly laid, yellowish brown; later, polished black. Size .66 by .288.

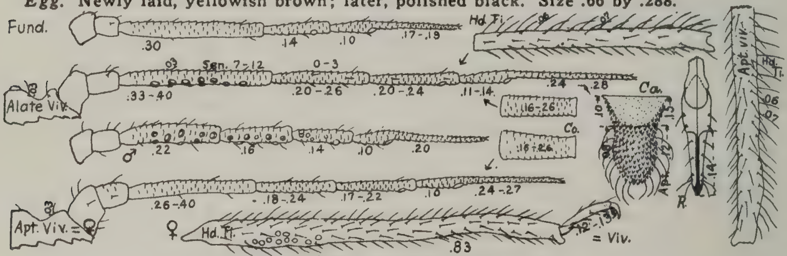

Fig. 196. *Aphis rumicis*

Collections. On leaves and stems of *Rumex crispus* and *R.* sp. Throughout region. Fundatrices April 1 and May 27, apterous summer viviparae April 9 to Nov. 7, alate viviparae May 2 to Sept. 5, sexuales Sept. 30 to Oct. 18; common.

Type. Lost. *Aphis carbocolor* Gillette, U.S.N.M., No. 41925. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Only slightly swollen hind tibia of the ovipara, relatively short thick cauda, absence of sensoria on IV of alate vivipara and apterous form of the male. These characters distinguish it from *A. fabae (A. rumicis* L. of Gillette and Palmer, Horsfall and others) also found on *Rumex* sp. but wintering on *Enonymus* sp. Difference in reticulation on body mentioned by Hille Ris Lambers (op. cit.) is not apparent in our specimens.

Aphis saliceti Kaltenbach

The Green and Pink Willow Aphid

Aphis saliceti Kaltenbach, 1843:103; Koch, 1854:118; Buckton, 1879:52; Gillette and Bragg, 1918a:89; Theobald, 1927:171; Gillette and Palmer, 1932b:440.
Aphis salicicola Thomas, 1878:8 and 1879:212; Monell, 1879:24; Cowen (in Gillette and Baker), 1895:121 (misspelled "*salicola*"); Gillette, 1910:403.

Apterous Summer Vivipara. Apple-green in some, often pinkish to rust-red in other individuals; with slight tessellation; antenna dusky, lighter on III; rostrum, cauda, anal plate and genital plate dusky to blackish; cornicle pale with dusky tip, legs sordid to dusky with tarsi and tips of tibiae black. Dorsum of body reticulated. Body length 1.6-2; hind tibia .95; antenna 1.25; cauda rather Macrosiphumlike.

Alate Vivipara. Alatoid Nymph. Green; tessellated. ***Adult.*** Head and thorax black; abdomen green, with lateral areas on all abdominal segments, dorsal bands on VII and VIII and appendages dusky. Same in measurements as aptera except antenna 1.05-1.15; rostrum obtuse, IV+V rather slender, attaining between 2d and 3d coxae. Hairs pointed, to blunt; .02-.03 long and semierect on antenna and hind tibia. Cauda elongate with acute tip, tapering to parallel-sided, bearing 3-4 ventrolateral and 3-4 dorsolateral pairs of hairs. Abdominal VIII without dorsal tubercle. Lateral tubercles well developed. Fore wing with 2d fork of media occasionally obsolete.

Ovipara. Apterous. Body length 1-1.30; antenna .70, division between III and IV sometimes faint; hind tibia on proximal half slightly swollen and bearing a few sensoria.

Male. Apterous. Body length .80-1; antenna .65-.85; hind tibia .50; cauda .04 on median line, .10 on side, with 4 or more pairs of lateral hairs.

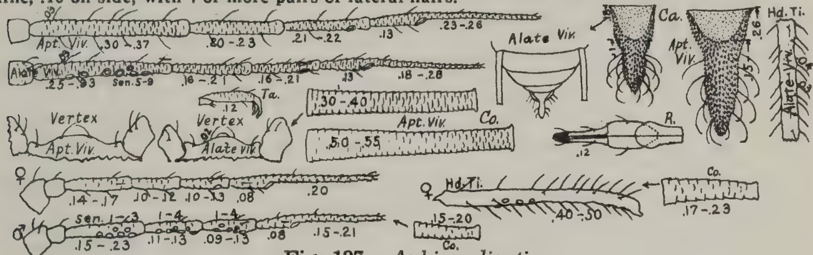

Fig. 197. *Aphis saliceti*

Collections. On leaves and twigs of *Salix* sp. Colorado: Fort Collins, Lyons, Colorado Springs, Rabbit Ears Pass, Steamboat Springs, and Antonito. Utah: Salt Lake City. Idaho: Buhl and Castleford. Apterous summer viviparae May 18 to Aug. 20, alate viviparae June 10 to Aug. 20, oviparae and eggs June 11 to Aug. 11, males June 11 to July 14; hardly common but often numerous where occurring.

Chief Distinguishing Characters. Long pale cornicle with dark tip in aptera, two body colors (green and rusty red), small number of sensoria (5-7) on III of alate vivipara, long, rather Macrosiphumlike cauda in aptera and early appearance of sexuales (June 11).

[Genotype *Aphis sambuci* Linnaeus]

Aphis sambuci Linnaeus, 1758:451; Theobald, 1927:95; van der Goot, 1915:230; Hille Ris Lambers, 1935:116 (biology); Jacob, 1949:90 (biology).

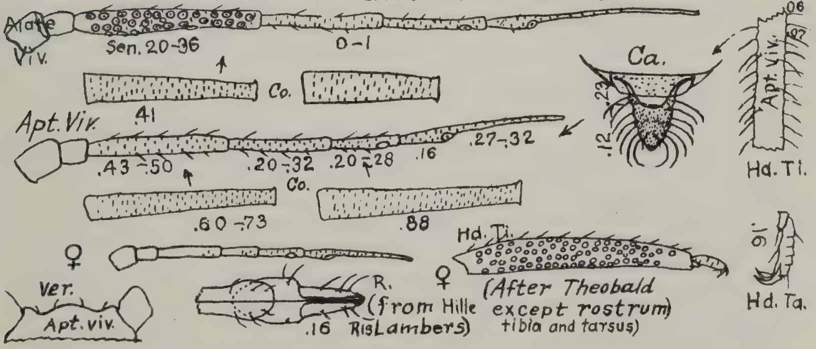

Fig. 198. *Aphis sambuci*

Apterous Vivipara. Young Nymph. Bright green to dark green. ***Alatoid Nymph.*** Tessellated. ***Adult.*** Sooty black to blackish green; dull; pulverulent, mostly in the form of white crossbands; appendages black. Body globose, length 2.95-3.8; hind tibia 1.50; hind tarsal II .16; antenna 1.90; rostrum attaining between 2d and 3d coxae.

Alate Vivipara. Color black to blackish shiny green. Body length 2-2.8; secondary sensoria with narrow margins. Hairs pointed, .03-.04 long, fairly numerous on body and antenna; .05-.07, numerous and nearly erect on hind tibia. Cauda parallel-sided, broad, with obtusely tapering tip and slight tendency to constriction before base, to approximately tapering, bearing 3-4 lateral, and 3 dorsolateral hairs on each side and about 4 dorsal ones. Lateral tubercles present on pronotum and abdominal I to V and on VII.

Hosts. Leaves and twigs of *Sambucus nigra* and sp. also reported from *Funkia subcordata* and *Hemerocallis albida* and as reported by Börner and Hille Ris Lambers (op. cit.), from roots of *Rumex obtusifolium* and sp. (Not recorded from region.)

Data for above description and figures were obtained from descriptions by Theobald (op. cit.) and van der Goot (op. cit.) and from study of apterous viviparae determined by Hille Ris Lambers.

Aphis sambucifoliae Fitch

The Elder Aphid

Aphis sambucifoliae Fitch, 1851:66; Davis, 1910d:490; Essig, 1917:342; Gillette and Palmer, 1932b:441.

Fundatrix. Same in color as summer vivipara. In measurements slightly longer in body and shorter in appendages as compared with summer vivipara.

Apterous Summer Vivipara. New-born Young. Rather bright light green with tan head; appendages colorless with blackish tips. *Adult.* Blackish green with dusky bands on terminal segments of abdomen; powdery patches on lateroventral margins of most abdominal segments, white tessellations on abdominal VI and VII of occasional individuals, especially in alatiform apterae; appendages dusky brown to blackish. Body length 2-2.5; hind tibia 1-1.25; antenna 1.4-1.8.

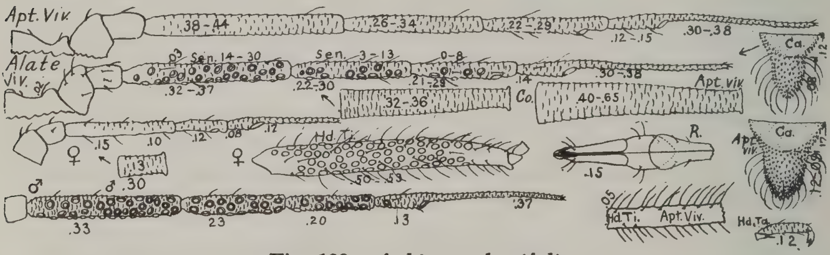

Fig. 199. *Aphis sambucifoliae*

Alate Vivipara. Alatoid Nymph. Tessellated dorsally and ventrally. *Adult.* Head and thorax black; abdomen blackish green; tibiae dusky with black tips; antenna, cornicle and cauda blackish. Body length 2-2.3; hind tibia 1.2; antenna 1.3-1.5; rostrum rather slender, attaining 3d coxa. Hairs very short and inconspicuous. Lateral tubercles large, especially on prothorax. Cauda broad and blunt, with slight constriction near base, with 6 lateral and dorsolateral pairs of hairs.

Ovipara. Apterous. Olive-yellow, mottled with darker color. Body length 1.30; antenna .75; cauda .05 on median line. Hind tibia swollen throughout and covered with numerous sensoria.

Male. Alate. About the same as alate vivipara except abdomen with dusky dorsal bands and lateral areas on all segments. Body length 2; antenna 1.40.

Collections. On twigs and leaves of *Sambucus pubens.* Colorado: Greeley, Fort Collins and Manassa. Fundatrices April 24 and May 2, apterous summer viviparae May 31 to Oct. 5, alate viviparae May 31 to Oct. 16, sexuales Oct. 5 to 16; fairly common.

Cotypes. U.S.N.M.

This species has been considered by some as identical with *A. sambuci* Linnaeus but Theobald (1927:95) and van der Goot (1915:231) mention sensoria on antennal IV and V as 0 to 1, while all our forms observed have several sensoria on IV and V, very rarely one or none on V. Cornicle in our form is also shorter. There is considerable resemblance to *A. sambucaria* Passerini as described by Theobald (1927:149), but length of the cauda is much less than half that of cornicle, the proportion given by Theobald for Passerini's species.

Aphis senecio-radicis (Gillette and Palmer)

Anuraphis senecio-radicis Gillette and Palmer, 1929a:9 and 1932b:442.
Aphis senecio-radicis, Gillette and Palmer, 1932b:442.

Apterous Summer Vivipara. Dusky blue-green, shading to brownish on head, and with dark bands on terminal segments; slightly pulverulent; cornicle, cauda, anal and genital plates black; appendages dusky to blackish throughout. Body 2.80 by 1.70; hind tibia .90-1.05; secondary sensoria variable in size. Rostrum hairy, attaining abdominal I or II.

Alate Vivipara. Head and thorax black; abdomen bluish green, dusky on lateral areas of all segments and dashes on dorsum of abdominal VII and VIII; appendages, cornicle and cauda dusky to black throughout. Body length 2.2; hind tibia, cauda and antenna as in aptera: secondary sensoria not tuberculate. Hairs fine, pointed, moderately numerous and erect, .04-.05 long on body, antenna and hind tibia. Cornicle imbricated, cylindrical, without evident flange. Cauda obtusely tapering with only a very slight constriction, bearing 7 hairs on each side. Lateral tubercles present on all segments anterior to cornicles, but hardly evident posteriorly. Media of fore wing with 2d fork variable, sometimes absent.

Ovipara. Apterous. Same as apterous vivipara except hind tibia which is slightly swollen distally to middle and bearing 10-24 sensoria.

Male. Apterous. Body length 1.20; hind tibia .70; antenna .90, III and IV more or less coalesced.

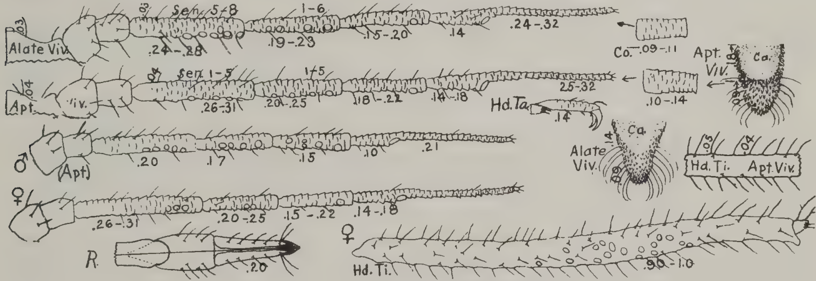

Fig. 200. *Aphis senecio-radicis*

Collections. On roots of *Senecio spartioides* and *S.* sp. Colorado: Salida, Grand Mesa, Colorado Springs, Battle Creek (northern Routt County), Fort Collins foothills and Virginia Dale. Idaho: Hansen. Apterous summer viviparae July 25 to Oct., alate viviparae Aug. 16 to Sept. 21, sexuales Oct. 30; rather common.

Types. U.S.N.M., No. 41457. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Absence of dorsal markings on apterous summer vivipara, length of unguis (not shorter than III, usually longer), length of cornicle (shorter than hind tarsal II), length of rostrum (IV+V .20 and attaining abdominal I or II), hairs erect, numerous and rather long (length equaling diameter of III) and slender hind tibia of ovipara, bearing few sensoria.

Aphis sensoriata Gillette and Bragg

Aphis sensoriata Gillette and Bragg, 1918b:330; Gillette and Palmer, 1932b:443.

Fundatrix. Rusty red to chestnut-brown; cornicle pale and with pale area about base; legs, cauda at tip and antenna, except most of III, dusky. Color resembles that of the bud scales at the bases of which they feed. Size 2-2.50 by 1.50-1.75; antenna .65, III, IV and V coalesced; hind tibia .70; cornicle .10. *Young.* Born from fundatrix, pale greenish with head brownish; appendages colorless with grayish tips of segments and tarsi.

Apterous Summer Vivipara. Appearing black or blackish with cornicle pale greenish yellow to blackish; but in alcohol, green with transverse blackish markings on dorsum of abdomen and a large blotch on abdominal IV, V and VI or more; appendages, cornicle and cauda black. Body length 2-2.25; hind tibia .80; antenna 1-1.1; rostrum hairy, attaining or surpassing 3d coxa. Hind tibia somewhat swollen on proximal half which portion bears 6-20 sensoria; otherwise as in alate vivipara.

Alate Vivipara. Black throughout, dorsal patch evident even in cleared specimen. Antenna, cornicle, cauda, and tibiae, except proximal portion, black. Body length 2; hind tibia .9-1; hind tarsal II .12; antenna 1.2, base of VI abruptly constricting to unguis, secondary sensoria oval, somewhat tuberculate; rostrum attaining between 2d and 3d coxae. Hairs pointed, rather numerous, drooping to semierect; .02-.03 long on antenna and hind tibia. Cornicle tapering, with flange, and with denticulate imbrications. Cauda short, hardly evident, much broader than long, rounded, with about 3 hairs on each side. Both alate and apterous viviparae, even as early as 2d instar, with hind tibia swollen on proximal half and bearing large circular sensoria on this portion. Fall alate vivipara may show little swelling and no more than 5 sensoria while spring and summer alatae may have as many as 18 sensoria on swollen portion.

Ovipara. Apterous. (In alcohol), pale yellow. Body length 1.25; antenna .58-.66; hind tibia .52-.60, swollen along entire length and covered with sensoria.

Male. Alate. Body length 1.40; antenna 1.40; hind tibia .70, not swollen and without sensoria.

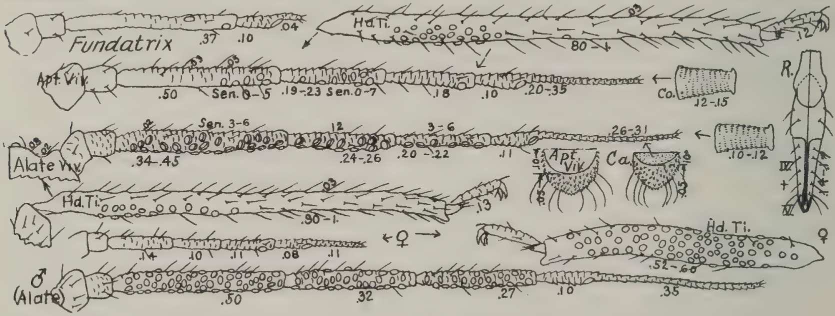

Fig. 201. *Aphis sensoriata*

Collections. On leaves and twigs of *Amelanchier* sp. Colorado: Log Cabin (west of Livermore), Laramie-Poudre Tunnel, Cameron Pass and Hesperus (all above altitude of 8000 ft.). Fundatrices May 26, apterous viviparae July 12 to Aug. 25, alate viviparae July 27 to Oct. 1, sexuales Oct. 1; rather rare.

Type. U.S.N.M., No. 41927. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Sensoria present on proximal somewhat swollen part of hind tibia of alate and apterous viviparae even in nymph, short broad cauda, long rostral IV+V (.14-.17), denticulate imbrications on cornicle, numerous sensoria on antenna of alate vivipara and their occasional presence in aptera and considerably swollen hind tibia of ovipara rather thickly covered with sensoria, short cornicle (.12-.14, hardly longer than hind tarsal II) and short unguis (hardly longer than two-thirds of III).

Aphis setariae (Thomas)

The Rusty Plum Aphid

Siphonophora setariae Thomas, 1877:5.
Aphis setariae, Oestlund, 1887:67; Gillette and Taylor, 1908a:41; Williams, 1910:57; Gillette and Palmer, 1932b:444.
Hysteroneura setariae, Cutright, 1925:197.

Fundatrix. Color and measurements same as summer aptera except sometimes III and IV coalesced.

Apterous Summer Vivipara. Dark chocolate-brown; shining; cauda, antennal III and IV, and tibiae except tips white; cornicle black; rostrum and anal and genital plates dark. Body length 1.4-2.3; hind tibia .80-1.1; hind tarsal II .11-.13; antenna 1.4-1.8, III and IV often coalesced in fall aptera, possible sexupara; rostral IV+V broad, attaining or surpassing 2d coxa.

Alate Vivipara. Head and thorax dark brown to blackish; abdomen medium brown with black lateral areas; shining; antenna, cornicle, rostrum, anal and genital plates, tarsi and tips of tibia black; cauda and tibiae white. Measurements as in aptera. Sensoria slightly convex; rostrum hardly attaining 2d coxa. Hairs on vertex, antenna and hind tibia .01-.015 long, pointed, fine and sparse. Cornicle slightly tapering, with indistinct flange, imbrications close and crenulate. Cauda slender, parallel-sided, somewhat wider at base, bearing 2 pairs of lateral hairs. Lateral tubercles present on prothorax and abdominal segments except V and VIII. Hind wing with cubitus vestigial or absent.

A minority of individuals were found to have shorter measurements: Apterae, antenna 1.07-1.4; III and IV often coalesced; body 1.2; alatae with these have III .25-.30 and sensoria 4-8 in one collections, 8-11 in another collection. No other differences are evident.

Ovipara. Apterous. Dark brown or brownish black. Body rather spindle-shaped posteriorly. Size 1.6 by .90; antenna .94, III and IV usually coalesced; hind tibia not noticeably swollen and bearing about 19 sensoria, mostly in middle portion.

Male. Apterous. Dark bronze-green. Some examples showing some rusty coloration. Body length .9-1.10; antenna 1-1.14.

Egg. Newly laid, sordid yellow; later, shining black. Size .66 by .31.

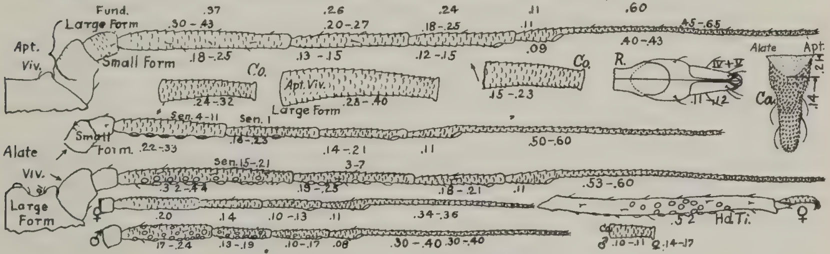

Fig. 202. *Aphis setariae*

Collections. On leaves and twigs of plum *(Prunus domestica)* as winter host and *Echinochloa crusgalli* and wheat *(Triticum vulgare)* as summer hosts. Throughout region. Fundatrices May 7, apterous summer viviparae May 24 to June 11 on winter host and Aug. 10 to Oct. 25, on summer host; alate viviparae June 13 to July 8 on winter host, Aug. 10 to Oct. 21 on summer host; sexuales Oct. 3 to Nov. 7; very common.

Cotypes. Ill. Nat. Hist. Surv. Collection, lectotype slide No. 7714, paratype slide No. 7715.

Chief Distinguishing Characters. Peculiar parallel-sided cauda, white in color, bearing 2 pairs of hairs, vestigial to absent cubitus of hind wing, broad rostral IV+V and long unguis (longer than III).

This species has been used as genotype for the genus *Hysteroneura* Davis, the distinguishing character being the absence of cubitus in the hind wing. This character varies from total absence to fragmentary traces. Furthermore, there seems to be no generic character whereby to classify apterae. In the opinion of the author *Hysteroneura* should not be considered of generic rank. The peculiar cauda can hardly be used as a generic character since the same shape of cauda appears in *A. asterensis* the cornicle of which differs widely from that of *A. setariae.*

Aphis solidaginifoliae Williams

Aphis solidaginifoliae Williams, 1910:58; Davis, 1911b:20; Gillette and Palmer, 1932b: 446.

Apterous Summer Vivipara. Black to reddish or greenish brown with black dashes on dorsum of all segments, which are coalesced from metathorax to abdominal VII inclusive (visible in mounted examples); shining; legs mostly sordid yellowish; antenna somewhat dusky; cornicle and cauda dusky to black. Dorsum of body reticulated. Body length 1.80-2; elongate-oval; hind tibia .70-.75; antenna 1-1.20. Hairs slightly capitate; .03-.05 long on body and hind tibia.

Alate Vivipara. Head and thorax black; abdomen greenish or brownish black, mounted specimens showing dorsal dusky bands on abdominal I, VI, VII and VIII and more or less on the remaining segments; antenna, cornicle, cauda and rostrum dusky to blackish; legs sordid yellow with black at tips of segments. Body length 1.40-1.60; hind tibia .75-.80; antenna 1.25, secondary sensoria slightly tuberculate and strongly convex; rostral IV+V broad, width at base equal to half the length, attaining between 2d and 3d coxae. Hairs slightly capitate, semierect; .02-.03 long on antenna, vertex and hind tibia. Cornicle cylindrical, smooth, with large flange preceded by groove. Cauda tapering, acute, broader than long, bearing two pairs of lateral hairs and a single dorsal preapical hair. Lateral tubercles present on abdomen but shallow and difficult to observe.

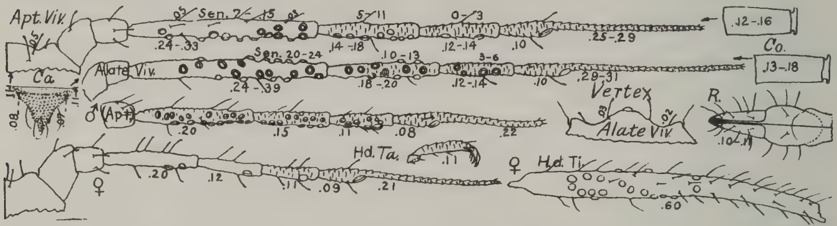

Fig. 203. *Aphis solidaginifoliae*

Ovipara. Apterous. Reddish black, mounted specimens showing dusky dorsal bands on all segments, sometimes coalesced; antenna, cornicle and cauda blackish; legs mostly yellow. Body length 1.60-1.70; antenna .85; hind tibia slightly swollen on proximal half which portion bears about 18 large sensoria.

Male. Apterous. Color same as in ovipara. Body length 1; antenna .82; cornicle .08; hind tibia .62.

Egg. Newly laid, pale honey-yellow; later, shining black. Size .66 by .35.

Collections. On *Solidago* sp., in leaves folded on midrib, appearing podlike. Colorado: Fort Collins. Idaho: Berger and Castleford. Apterous summer viviparae July 16 to Sept. 26, alate viviparae July 9 to Sept. 26 (scarce), oviparae Sept. 18 to Oct. 14, males Sept. 18 to 26; rather common.

Cotypes. Univ. of Neb. Collection, Nos. 91 and 92 and U.S.N.M., No. 111.

Chief Distinguishing Characters. Peculiar acute shape of the cauda with only 2 pairs of lateral hairs, tuberculate shape of the secondary sensoria, presence of sensoria on III, IV and V in both alate and apterous viviparae, rather broad rostral IV+V and hind tibia of the ovipara which is only slightly swollen with rather few sensoria.

Aphis sorensoni Knowlton

Aphis sorensoni Knowlton, 1928b:169.

Alate Vivipara. Head and thorax black; abdomen bluish green; antenna, cornicle, cauda, tarsi and tips of tibiae black; fore wing with veins typical.* Body length 1.55; across eyes .43; hind tibia 1; hind tarsal II .13; antenna 1.20, III .36, IV .23, V .20, VI .11+.35, sensoria 25-30 on III; cornicle .25; rostral IV+V .12 attaining barely to 2d coxa. Cornicle cylindrical and imbricated. Cauda spatulate, bearing 4-5 pairs of lateral hairs and one dorsal preapical one.

Collections. On *Salix lutea* (a single alate specimen without progeny; possibly accidental). Utah: Providence. Alate vivipara July 18.

Type. Knowlton Collection.

This specimen is very close to *A. helianthi* and not certainly distinct, differing only as follows: Slightly longer unguis (.35 instead of .25-.30) and longer tibial hairs (.03 instead of .01-.02).

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*Described in original description as "slightly dusky" but this coloration was not noticeable on type specimen when examined by the writer in 1945.

Aphis spiraecola Patch

The Spirea Aphid

Aphis spiraeella Schouteden (misidentification), Gillette, 1910:404.
Aphis spiraecola Patch, 1914a:270 and 1923a:56 and 1929:698; Gillette and Palmer, 1932b:447.

Apterous Summer Vivipara. Light greenish yellow or yellowish green to apple-green; head dusky; appendages mostly pale; cauda and cornicle black. Body length 1.20-1.70; hind tibia .55-.80; antenna 1.10-1.13.

Alate Vivipara. Head and thorax black; abdomen light yellowish green with dusky on lateral areas and at base of each cornicle. Same otherwise as aptera except as follows: Secondary sensoria nearly flat; rostrum attaining between 2d and 3d coxae. Hairs pointed, drooping to semierect; on hind tibia, slightly longer than diameter of tibia. Cauda elongate, parallel-sided with slight neck, rather spoon-shaped and bearing 3-4 lateral and 3 dorsolateral hairs on each side. Lateral tubercles present.

Ovipara. Apterous. Body length 1.20; antenna .55-.80; hind tibia dusky, conspicuously swollen and closely covered with nearly flat sensoria.

Male. Alate. Body length 1.30; hind tibia .70; antenna 1.10.

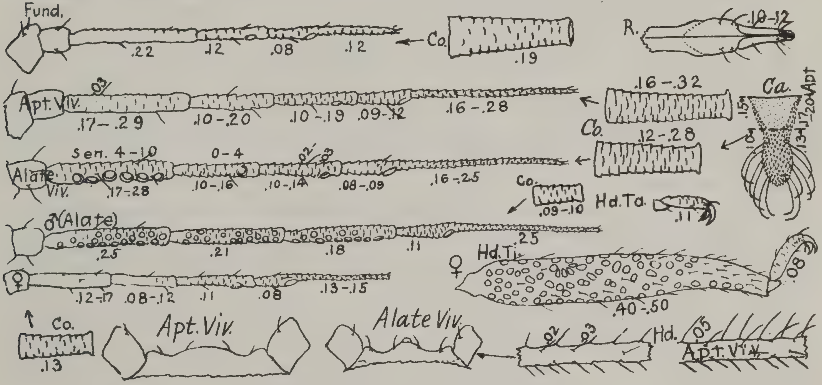

Fig. 204. *Aphis spiraecola*

Collections. On leaves and twigs of *Spirea van houttei* and *S.* sp., *Helichrysum* sp., *Viburnum opulus* var. *sterile*, *Cosmos bipinnatus*, and *Prunus japonica.* Throughout region. Fundatrices April 21, apterous summer viviparae May 15 to Oct. 25, alate viviparae May 15 to Oct. 25, oviparae Sept. 2 to Oct. 28, males Sept. 2 to Oct. 28; very common.

This species has been considered as only a race of the same species as *A. pomi* (Patch 1929:689). In the viviparous forms the *Spirea* aphid is distinguished from the apple aphid only by the smaller size and this character intergrades, but in the sexuales distinct differences occur. The alate form of the male and the dark colored, distinctly swollen closely sensoriated hind tibia of the ovipara on *Spirea* (Patch 1923a:56) seem to clearly distinguish this form from *A. pomi.*

Aphis spiraephila Patch

The Brown Spirea Aphid

Aphis spiraephila Patch, 1914a:270; Gillette and Palmer, 1932b:448.

Fundatrix. Color same as summer aptera. Body length 2.10; hind tibia .75-.80; antenna .75-.80, III+IV (coalesced) .30, V .14, VI .10+.10; cornicle .10.

Apterous Summer Vivipara. Head blackish, rest of body hazel to chestnut-brown; covered with powdery reticulations; anal and genital plates, cornicle, rostrum and cauda dusky to black; appendages mostly pale yellowish. Body length 1.30-1.70; hind tibia .63-.78; antenna .75-1.

Alate Vivipara. Head and thorax blackish; color otherwise same as aptera. In mounted specimens, abdomen immaculate except dorsal band on abdominal VIII and lateral specks at spiracles. Body length 1.60-1.75; hind tibia .90-1; antenna 1-1.15; rostrum rather broad hardly attaining 2nd coxa. Hairs pointed; .03-.04 on hind tibia. Cornicle cylindrical or slightly tapering, without distinct flange, imbricated, sometimes slightly curved inwards. Cauda elongate, spoon-shaped, bearing 3-4 lateral and 3-4 dorsolateral hairs on each side. Lateral tubercles present.

Ovipara. Apterous. About same size as apterous vivipara, but more spindle-shaped; antenna .72-.80; hind tibia pale, hardly swollen and bearing scattered, rather large, convex sensoria along most of length, but mostly on proximal half.

Egg. Newly laid, light brownish yellow; later, black. Size .53 by .30.

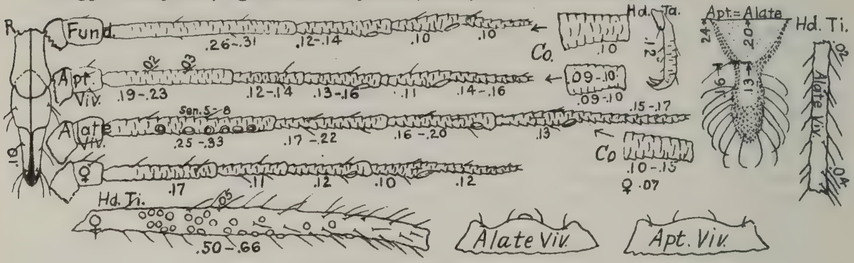

Fig. 205. *Aphis spiraephila*

Collections. On leaves and twigs of *Spirea* sp. Colorado: Greeley. Fundatrices May 7, apterous summer viviparae June 9 to Oct. 21, alate viviparae June 9, oviparae Oct. 21; rare but numerous where found.

Cotypes. Maine Agr. Exp. Sta. Collection.

This species differs from the original description of *A. spiraephila* in the color which is given by Patch as "black"; but no structural differences were found and the determination was confirmed by Patch after examination of some of our specimens.

Chief Distinguishing Characters. Long spoon-shaped cauda with bushy hairs, small number of sensoria (5-8) on III of alate vivipara, short, flangeless cornicle (not longer than cauda) and only slightly swollen hind tibia of ovipara.

Aphis tetradymia Knowlton

Aphis tetradymia Knowlton, 1941a:136.

Apterous Summer Vivipara. "Bluish green; antenna, cornicle and cauda blackish. Size 1.3 by .75; hind tibia .60-.71; hind tarsal II .10; antenna .81," III .15-.23, IV .07-.10, V .07-.10, VI .07-.10+.14-.20; sensoria 0-2-"4" on III, 0-"1" on IV; cornicle .11-.13; "rostral IV+V rather thick, .13 long, attaining abdomen. Cauda bearing 4-5 pairs of lateral hairs and 3 dorsal to dorsolateral ones. Lateral tubercles not all conspicuous."

Collection. On above ground parts of *Tetradymia canescens.* Utah: Fisher's Pass. Apterous summer viviparae Aug. 16; rare.

Cotypes. Knowlton Collection.

This species appears to be very close to *A. maidi-radicis* but Knowlton states that it was found feeding above ground instead of underground and that it differs as follows: Darker bluish green, smaller size of body, longer antenna and usual presence of sensoria on III and IV of aptera.

Study of the complete life history stages may reveal more distinct differences, as only apterous viviparae have as yet been taken.

Not figured on account of close similarity to *A. maidi-radicis* Forbes.

Aphis tetrapteralis Cockerell

Aphis tetrapteralis Cockerell, 1902:40; Gillette and Palmer, 1932b:449.

Apterous Summer Vivipara. Grayish green; cauda and antenna dusky; cornicle and legs pale. Body length 1; hind tibia .45-.60; hind tarsal II .10; antenna .55-.60; rostrum attaining abdomen.

Alate Vivipara. Same as aptera except as follows: Antenna .70. Hairs pointed, inconspicuous. Cauda, tapering, acute, longer than wide, bearing 3-4 lateral pairs of hairs.

Collections. On leaves of *Atriplex* sp. Colorado: Colorado Springs, Trinidad, Waverly and Grover. Alate and apterous viviparae June 10 to Aug. 30; rare, probably on account of scarcity of hosts where collecting has been done.

Cotypes. U.S.N.M.

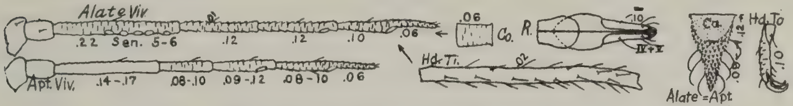

Fig. 206. *Aphis tetrapteralis*

Chief Distinguishing Characters. Short acute cauda bearing 3-4 pairs of lateral hairs, short cornicle (shorter than the cauda), short unguis (no longer than the cornicle and shorter than hind tarsal II).

Aphis tulipae Boyer de Fonscolombe

The Tulip Aphid

Aphis tulipae Boyer de Fonscolombe, 1841:167; Felt, 1909:19; Gillette and Palmer, 1932b:450.

Anuraphis tulipae, Theobald, 1927:238.

Apterous Summer Vivipara. Fawn color to pinkish or greenish with head, pair of patches on pronotum and dorsal dashes on abdominal VII and VIII and dorsal speckles dusky; distal half of antenna, tip of rostrum, cornicle, cauda, anal plate, tarsi and tips of tibiae dusky to blackish. Body length 1.90; hind tibia .75-.85; antenna 1.

Alate Vivipara. Head and thorax black; abdomen pale yellow or greenish with dark dorsal patch on III, IV and V often also on VI and VII; all appendages and anal plate dusky to blackish. Body length 1.50-1.70; hind tibia .90; antenna 1.20-1.30; rostrum attaining between 2d and 3d coxa. Hairs pointed, drooping; .02-.03 long on hind tibia. Cornicle cylindrical, with distinct flange and but faintly imbricated. Cauda tapering, about as broad as long and bearing 2 pairs of lateral hairs and a single preapical one. Lateral tubercles developed. A pair of dorsolateral tubercles on abdominal VII and VIII and on occiput on head.

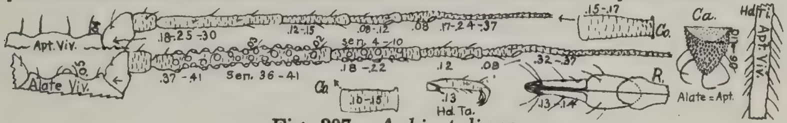

Fig. 207. *Aphis tulipae*

Collections. At bases of stems of celery *(Apium graveolens)*, water hemlock *(Cicuta douglasi)*, carrot *(Daucus carota)*, on bulbs of *Gladiolus* sp., *Iris* sp. and *Tulipa* sp. Colorado: Boulder, Denver and Las Animas. Utah: Layton and Logan. Alate and apterous viviparae April 15 to Sept. 25 and throughout the winter on bulbs in storage; not very common.

Chief Distinguishing Characters. Short tapering cauda, bearing 5 long hairs, numerous tuberculate sensoria on III and IV of alate vivipara and short imbricated cornicle (not longer than rostral IV+V).

Aphis unaweepiensis Hottes

Aphis unaweepiensis Hottes, 1948b:33.

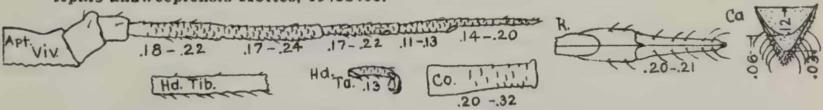

Fig. 208. *Aphis unaweepiensis*

Apterous Summer Vivipara. (Mounted on slide), body green, immaculate; appendages pale except following parts which are dusky to blackish: Antenna beyond middle of IV, cornicle especially distally, cauda, anal and genital plates, rostral III and IV+V, coxae, femora, knees, tarsi and tips of tibiae. Body length 2-2.50; across eyes .45-.46; antenna .90-1.17; hind tibia .80-.93; rostrum attaining abdominal II or III. Lateral tubercles but slightly developed, noticeable on abdominal II, III, IV and VII. Cornicle cylindrical or slightly stouter at base and without distinct flange. Cauda tapering, acute and bearing 5-6 hairs on each side; no preapical dorsal hair evident.

Collections. On roots of *Sarcobatus vermiculatus.* Colorado: Grand Mesa near Collbran. Apterous viviparae Aug. 4; rare.

Type. U.S.N.M. Paratypes, Hottes Collection.

Chief Distinguishing Characters. Pale immaculate body, antennal structure (partially coalesced III, IV and V), length of cornicle (equal to or longer than III and without definite flange), short, abruptly tapering, acute cauda bearing 5 hairs on each side, long rostral IV+V (.20 long) equalling length of III and relative lengths of antennal segments (III, IV and V coequal and unguis slightly shorter).

Aphis urovaneta Hottes

Aphis urovaneta Hottes, 1950:24.

Apterous Summer Vivipara. "Black; with powdery covering, giving grey appearance"; (mounted on slide), antennal I, II and VI, rostrum, cornicle, cauda, anal plate, genital plate, femora, tarsi, knees and tips of tibiae blackish. Body length .95-1.20; across eyes .29-.35; antenna .70-.85; hind tibia .47-.70; rostrum attaining 3d coxa. Hairs short and sparse, inconspicuous. Cornicle approximately cylindrical. Cauda slender, tapering, acute, bearing 4 pairs of hairs.

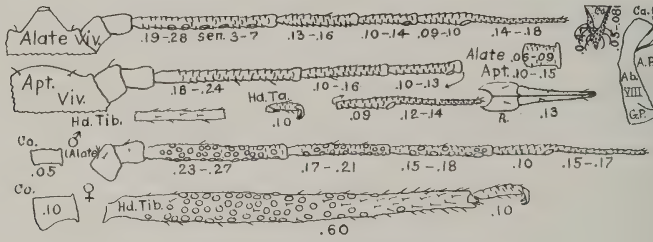

Fig. 209. *Aphis urovaneta*

Alate Vivipara. Color same as apterous vivipara except antenna which is dusky with only base of III lighter. Body length .85-1; across eyes .27-.32; antenna .80-.93; hind tibia .45-.60; rostrum attaining abdomen. Cauda slender, acute and inconspicuous. Vertex cone-shaped. Hairs inconspicuous.

Ovipara. Apterous. Color and measurements as in apterous vivipara, except hind tibia which is slightly dusky and body length 1.35. Hind tibia distinctly swollen on nearly entire length and bearing many rather large sensoria.

Male. Alate. Color and measurements as in alate vivipara except as shown in figure.

Collections. On *Eriogonum* sp. Colorado: Gateway. Apterous viviparae Aug. 24 to Oct. 1, alate viviparae Aug. 24, sexuales Oct. 1; rare.

Type. U.S.N.M. Paratypes, Hottes Collection.

Chief Distinguishing Characters. Cone-shaped vertex in alate vivipara, small, acute cauda, small number of sensoria on III of alate vivipara, slender rostral IV+V and short cornicle (shorter than base of VI).

Aphis valerianae Cowen

Aphis valerianae Cowen, (Gillette and Baker) 1895:121; Gillette and Palmer, 1932b: 451.

Apterous Summer Vivipara. Blackish green to greenish black; cauda and cornicle black; appendages brownish to dusky. Cleared specimens show head, pronotum, mesonotum, lateral areas in all abdominal segments, area behind cornicle, bands on abdominal VII and VIII, anal and genital plates dusky. Dorsum reticulated. Body length 2-2.50; hind tibia .80-1; antenna 1-1.35.

Alate Vivipara. Alatoid Nymph. Thorax green, other parts black; abdomen tessellated. *Adult.* Head and thorax brownish black, abdomen greenish black; antenna, cornicle and cauda dusky to blackish; tibiae pale brownish with tips black. Cleared examples show the following dusky markings on abdomen: Lateral areas, blotch at cornicle base, a dorsolateral row of irregular spots, dorsal bands on abdominal VII and VIII, and median broken spot on V and VI, venter of abdominal I, anal and genital plates. Body length 1.65-2; hind tibia 1; antenna 1.30-1.65, secondary sensoria convex and tuberculate; rostrum attaining between 2d and 3d coxae. Hairs pointed, not numerous. Cornicle cylindrical or slightly tapering, with flange and with imbrications slightly denticulate. Cauda parallel-sided, obtuse, with but slight tendency to constriction, bearing 4-5 hairs on each side. Lateral tubercles present on prothorax and abdominal I and VII.

Male. Alate. Body length 1.30-1.50; hind tibia .85; antenna 1.40, secondary sensoria 24 on III, 8 on IV, 5 on V; cornicle .12.

Ovipara. Apterous. Body length 1.30; antenna .78-.95; cornicle .14; hind tibia slightly swollen and bearing about 10 faint sensoria.

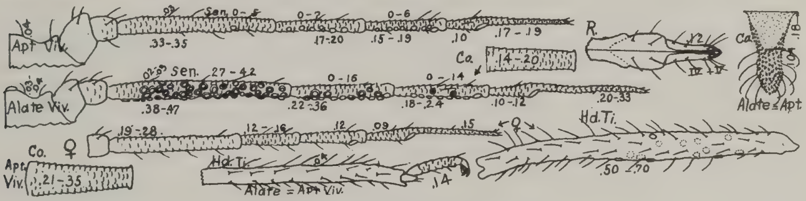

Fig. 210. *Aphis valerianae*

Collections. On leaves and stems of *Valeriana edulis.* Colorado: Log Cabin (west of Livermore), Cherokee Park, Pingree Park, Rocky Mountain National Park, Grand Mesa, Gunnison, Lost Lake (at Crystal Mountain), Steamboat Springs and Fort Collins. Apterous viviparae June 30 to Sept. 6, oviparae Sept. 6, males Sept. 26; not rare.

Neotype. U.S.N.M.

Chief Distinguishing Characters. Usual though variable presence of rather numerous tuberculate secondary sensoria on III, IV and V of alate and often on apterous vivipara, slightly denticulate imbrications on the cornicle, dark green body and tessellated alatoid nymph and short unguis (shorter than III).

Aphis varians Patch

The Variable Currant Aphid

Aphis varians Patch, 1914b:50 and 1927:4; Gillette and Palmer 1932b:452.

Same as given for *A. neomexicana* Cockerell excepting slightly more numerous secondary sensoria on antenna of alate vivipara and longer and rather more numerous and more erect hairs. Another difference is the effect on the host, namely curling of leaves.

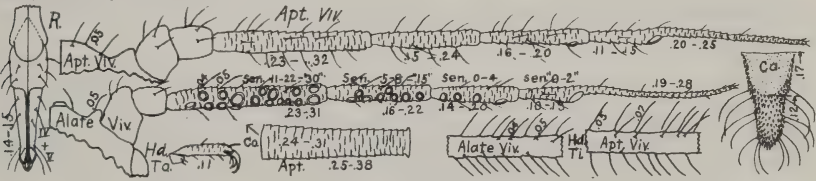

Fig. 211. *Aphis varians*

Collections. In curled leaves of golden currant *(Ribes aureum),* black currant *(R. nigrum)* and gooseberry (*R.* sp.). Colorado: Fort Collins and Rabbit Ears Pass. Idaho: Beaver Canyon. Utah: Generally in northern half of the state. Apterous summer viviparae May 26 to Aug. 29, alate viviparae May 26 to July 25; not very common.

Cotypes. Maine Agr. Exp. Sta. Collection.

This species differs slightly from the original description of *A. varians* in slightly smaller number of sensoria in the antenna of alate vivipara. The resemblance to *A. oenotherae* is very close. However, cornicle in alata vivipara of *A. oenotherae* is usually shorter than unguis while in *A. varians* cornicle is usually longer than unguis. The difference of host makes it seem best not to pronounce the two forms as identical without experimental biological work. The description of *A. grossulariae* Kaltenbach agrees in all particulars mentioned except Kaltenbach's statement that "cornicles are one-half to two-thirds normal length."

Aphis viburnicola Gillette

The Snowball Aphid

Aphis viburnicola **Gillette, 1909b:280; Gillette and Bragg 1915a:102 and 1918b:329; Gillette and Palmer, 1932b:452.**

Fundatrix. First Instar. **Apparently ashy gray, but really pale greenish yellow, heavily covered with powder, with four rows of black dots; cornicle hardly elevated, appearing as a double ring; head, and appendages dusky brown.** ***Young Adult.*** **Light green; covered with powder; distal half to entire antenna, cornicle, cauda, anal and genital plates and entire tibiae and tarsi and tip of rostrum dusky to black.** ***Old Adult.*** **Deep green; covered with powder. Size 2.50-3 by 1.5; hind tibia .90; antenna .90, III and IV coalesced; hind tibia not noticeably swollen but bearing a few sensoria.**

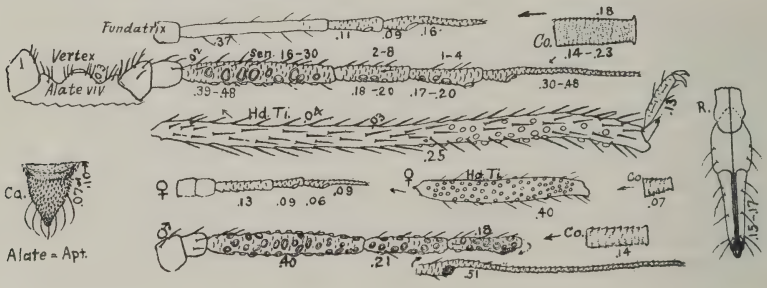

Fig. 212. *Aphis viburnicola*

Alate Vivipara. Newborn. **Pale greenish yellow to very pale yellow; covered with white powder, not showing black spots as in young fundatrix.** ***Adult Spring Migrant.*** **Head and thorax black; abdomen pale greenish yellow with dusky to blackish green lateral areas and dorsal bands, the latter coalesced on abdominal II to VIII; appendages, cornicle, rostrum and anal and genital plates dusky to black; cauda pale to dusky. Body length 2.5-2.7; hind tibia 1.25; antenna 1.2-1.6, secondary sensoria large, subcircular, tuberculate; rostrum obtuse, barely attaining 3d coxa. Antenna rather stout, as wide or wider than hind tibia; base of VI abruptly constricted to unguis. Hairs pointed, rather drooping, numerous. Cornicle cylindrical or slightly tapering, with flange and with denticulate, very closely placed imbrications. Cauda tapering, acute, about as broad as long and bearing 3 hairs on each side. Hind tibia of spring migrants swollen on distal half which portion bears about 20 sensoria. Lateral tubercles distinct. A pair of dorsal tubercles present on abdominal VIII.** ***Fall Migrant.*** **Same as spring migrant except as follows: Abdomen rusty brown instead of pale, with dark bands on II to VIII and hind tibia not noticeably swollen but usually bearing a few sensoria.**

Ovipara. Nymph and Young Adult. **Pale yellow; covered with white powder; later becoming sordid yellow.** ***Older Adult.*** **Apterous. Salmon-pink, mottled with brownish with eggs showing through dorsal body wall; appendages pale to light brownish. Body length 1.50-1.80; hind tibia .40; antenna .45-.50, III and IV coalesced; hind tibia distinctly swollen along entire length and bearing numerous sensoria.**

Male. **Alate. Head and thorax black; abdomen rusty brown, with lateral areas, blotch behind cornicle, and narrow dorsal bands dusky; antenna, tibiae, anal and genital plates and cornicle black; cauda dusky. Body length 1.8-2; hind tibia .55; antenna 1.40-1.60, segments thick .06 in diameter, broader than hind tibia.**

Egg. **Newly laid, pale yellow; later, black; shining. Size .66 by .20.**

Collections. As winter host, on leaves of *Viburnum opulus* var. *sterile*, causing curling of leaves in spring, (summer host unknown). Throughout region. Fundatrices April 1 to June 11, spring migrants (entire progeny of fundatrix) May 8 to June 9, fall migrants Sept. 2 to Nov. 3, sexuales Sept. 7 to Nov. 5; quite common and troublesome.

Type. U.S.N.M., No. 42814. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Presence of sensoria on the hind tibia of alate and apterous viviparae on the primary host, sculpturing of the cornicle (fine, crowded, denticulate imbrications), heavy antenna in alata (diameter of III rather exceeding that of hind tibia), sudden narrowing of base of VI to form the unguis, shape of the cauda (acute, tapering, with 3 pairs of lateral hairs), five-segmented antenna of fundatrix and ovipara, long rostral IV+V and habit of all individuals of the second generation acquiring wings and leaving the winter host plant.

Aphis viburniphila Patch

The Viburnum Aphid

Aphis viburniphila Patch, 1917:416; Gillette and Palmer, 1932b:454.

Apterous Vivipara. Head blackish; rest of body reddish brown mottled with paler shades and marked with dusky dorsal bands posterior to cornicles; appendages mostly whitish to yellow; cornicle black, cauda and anal plate dusky. Body length 2; hind tibia .95; hind tarsal II .12; antenna 1.1-1.5. Hairs rather numerous, erect; .05-.09 on hind tibia.

Alate Vivipara. Head and thorax brownish black; abdomen reddish brown, sometimes green; mottled. Body length 2; hind tibia 1; hind tarsal II .11; antenna 1.3; rostrum attaining between 2d and 3d coxae. Cauda parallel-sided to blunt-tapering, not longer than broad, bearing about 4 pairs of lateral and 3 pairs of dorsolateral hairs. Lateral tubercles present. Hairs pointed, erect, moderately numerous; .05 long on antenna; .05-.07 on hind tibia; .06 on body.

Ovipara. Apterous. Color as in apterous vivipara. Body somewhat pointed posteriorly, length 1.55-1.80; antenna 1.10-1.25, usually without secondary sensoria; hind tibia not swollen but bearing about 4 flat sensoria on distal third.

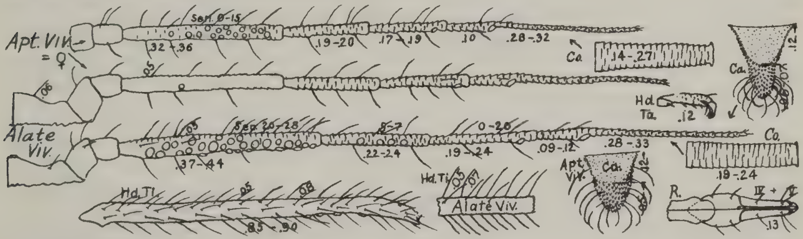

Fig. 213. *Aphis viburniphila*

Collections. On leaves and stems of *Viburnum opulus* and var. *sterile*. Colorado: Fort Collins, Boulder and Denver. Apterous viviparae May 24 to Oct. 26, alate viviparae May 24 to Oct. 17, oviparae Oct. 14; rather common.

Cotypes. Maine Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Long erect hairs, nearly twice as long on tibia as diameter of tibia, reddish brown mottled body, short bushy parallel-sided to bluntly tapering cauda, frequent presence of numerous sensoria on III of apterous vivipara, and presence of rather numerous sensoria (20-28, on III and 5-7 on IV) on antenna of alate vivipara and character of hind tibia of ovipara (not noticeably swollen and bearing very few, only 4, sensoria and those on distal portion, instead of the usual proximal location).

Aphis vorabonnevilla Knowlton and Smith

Aphis vorabonnevilla **Knowlton and Smith, 1936a:487.**

Alate Fall Vivipara. **(Mounted in balsam), dark markings as follows: Abdomen with both dorsal and ventral bands and lateral areas on all segments, with dorsal bands coalesced on III to VI; antenna, cauda, cornicle and tips of tibiae black or blackish; tibiae dusky. Body length about 2; across eyes .45; antenna 1.50; abdomen marked with rows of denticles; hind tibia .90-1; hind tarsal II .10-.12; rostrum attaining 2d coxa.**

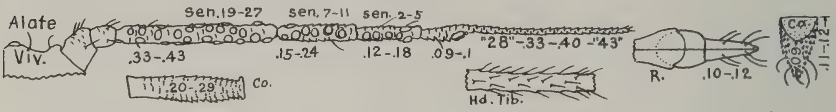

Fig. 214. *Aphis vorabonnevilla*

Collections. On *Populus deltoides, P. angustifolia* and *Salix* sp. Utah: Paradise, Salt Lake City and Wellsville. Fall migrants swarming Sept. 20 to Oct. 6, fall migrants and alate males in traps in peach trees in Colorado at Paonia in October. This species is evidently in migration from its summer host and may have been only accidentally resting on the above-mentioned trees.

Cotypes. Knowlton Collection.

Chief Distinguishing Characters. Number of sensoria on III in alate vivipara (19-27), presence of sensoria on IV and V, caudal hairs fewer than 3-4 lateral pairs, length of cornicle (.20-.29, no longer than unguis), slightly swollen shape of cornicle, denticulate imbrications of cornicle and rows of denticles on dorsum of abdomen, length of rostral IV+V (.10-.12) and shortness of the antenna.

Aphis zonassa Knowlton

Aphis zonassa **Knowlton, 1935c:138.**

Apterous Summer Vivipara. **Black; with all appendages black. Body length 1.50-1.70; across eyes .40; dorsum of abdomen marked with reticulations; hind tibia .95-1; hind tarsal II .11-.12; rostrum attaining nearly to 3d coxa, "sometimes to abdomen."**

Alate Vivipara. **"Black." (Mounted in balsam after clearing), dusky on imbricated lateral areas on abdomen; appendages, cauda and cornicle, black. Body length 1.2-1.3 (shrivelled probably 1.5 in normal condition); across eyes .40; hind tibia .76; hind tarsal II .11-.12; rostrum attaining about to 3d coxa. Fore wing with venation normal except media in one wing in one example only once-branched.**

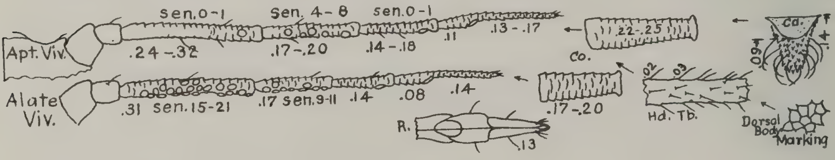

Fig. 215. *Aphis zonassa*

Collections. On *Chrysothamnus parryi* and C. sp. Utah: Kanab. Colorado: Buckhorn Creek (above Masonville). Apterous and alate viviparae June 26 to Aug. 20.

Type and Paratypes. Knowlton Collection.

Chief Distinguishing Characters. Number of sensoria (15-21) on III and 9-11 on IV) of alate vivipara and length of cornicle (in alate vivipara .17-.20, in aptera .22-.25).

A. lugentis comes very close and differs, apparently, only in slightly and doubtfully more numerous sensoria (19-24) on III, larger body size (2 or more in length) and the different host plant (*Senecio* sp.)

Genus **Asiphonaphis** Wilson and Davis

Wilson and Davis, 1919c:39.

Characters. Cornicle absent. Otherwise same as genus *Aphis*.

Genotype (monotypical), *Asiphonaphis pruni* Wilson and Davis.

Key to Species of Asiphonaphis

1. Sensoria more than 10 on III of alata; unguis 3 times length of base of VI (p. 187) .... *pruni*

.... Sensoria not more than 10 on III of alata; unguis not longer than 2 times base of VI (p. 187) .... *utahensis*

Genotype *Asiphonaphis pruni* Wilson and Davis

Asiphonaphis pruni **Wilson and Davis, 1919c:39; Gillette and Palmer, 1932b:455.**

Fundatrix. Same as summer apterous vivipara except that body is rather larger and more robust; size 2.40-2.60 by 1.60; antenna 1, six-segmented.

Apterous Summer Vivipara. Head and pronotum brownish; rest of dorsum pale yellowish or whitish green, with intersegmental lines bluish green and broader on median line, sometimes coalescing to form median line of green; appendages pale brownish with tarsi and tips of tibiae black. Body length 1.60-2.40; hind tibia .80-.85; antenna 1-1.2; rostrum rather broadly obtuse, attaining between 1st and 2d coxae.

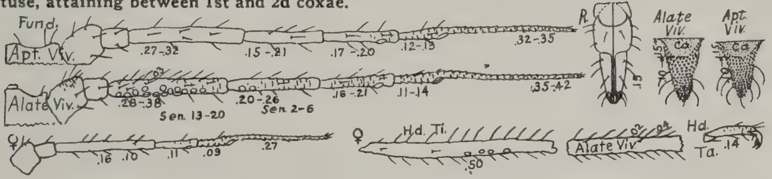

Fig. 216. *Asiphonaphis pruni*

Alate Vivipara. Head and thorax black; abdomen pale greenish yellow to whitish, with narrow bluish green intersegmental lines sometimes broadened medially to form median line anterior to V, replaced on VII and VIII by dusky bands; broken dashes on middle of I, dusky lateral areas on I to VI inclusive; antenna, femora, knees, tarsi, anal plate and tips of tibiae black; cauda pale; wing venation not noticeably dusky. Body length 1.8-2; hind tibia .90-1; antenna 1.2-1.4. Hairs pointed. Cauda tapering or parallel-sided with slight constriction at middle, bearing 2-3 hairs on either side and a single dorsal preapical one at tip. Lateral tubercles large and conspicuous on prothorax and all abdominal segments except V.

Ovipara. Apterous. Color same as in apterous vivipara. Body length 1.6-2, rather pointed posteriorly; antenna .85; hind tibia slightly swollen and bearing a few sensoria.

Egg. At first, pale yellow; later, black. Size .70 by .26.

Collections. On leaves of *Prunus virginiana* and *P. armeniaca*. Colorado: Boulder, Estes Park, Bellvue and Fort Collins. Utah: Bountiful and Moab. Fundatrices May 6, apterous summer viviparae May 13 to Sept. 15, alate viviparae May 25 to Aug. 11, oviparae Oct. 11; not rare.

Cotypes. U.S.N.M., Davis and Granovsky Collections.

This form differs from the original description of *Asiphonaphis pruni* in slightly shorter antenna, entire lack of sensoria on V and lack of noticeable duskiness of wing venation. The host is a different species of *Prunus*. The differences seem hardly of specific significance so the Colorado specimens are here placed under Wilson's and Davis' species.

Asiphonaphis utahensis Knowlton

Asiphonaphis utahensis **Knowlton, 1937a:170.**

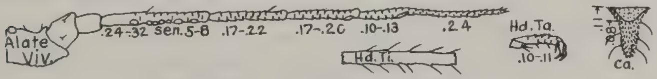

Fig. 217. *Asiphonaphis utahensis*

Alate Vivipara. (Cleared and mounted on slide), head and thorax black; abdomen with lateral dusky spots and bands on I, VII and VIII, broken dashes on VI; antennae, coxae, tarsi, tips of tibiae and cauda black. Body length 1.25-1.70; across eyes .32-.37; antenna 1.24-

1.3; hind tibia .70-.73; rostral IV+V slender .114, attaining 2d coxa. Lateral tubercles present, more noticeable on prothorax and abdominal I and VII. Cauda slightly tapering, bearing 3 hairs on each side.

Collections. On *Salsola* sp. Utah: Thompsons. Alate viviparae Sept. 13.

Type. U.S.N.M.

This species differs from *A. pruni* as follows: Sensoria on III fewer than 10 and absent on IV and hairs on antenna sparse and practically invisible.

Genus **Aspidaphis** Gillette

Gillette, 1917c:196; Baker, 1920a:44; Gillette and Palmer, 1932b:456.

Characters. Vertex strongly convex; frontal tubercles distinctly produced, fully equal with vertex. Antenna five-segmented; secondary sensoria circular. Cornicle clavate, recumbent, without flange, and with opening placed laterally on median side of distal end. Lateral tubercles absent. Hairs very inconspicuous. Tergite VIII forming triangular shield extending over cauda. Wing venation as in genus *Aphis*.

Genotype (monotypical), *Aspidaphis polygoni* Gillette (syn. of *Aphis adjuvans* Walker).

Key to Species of Aspidaphis

1. Length of hind tibia .85 or longer; sensoria 14 on III in alata (p. 189) .... *aquatica*
.... Length of hind tibia shorter than .85; sensoria fewer than 14 on III of alata 2
2. On *Polygonum* (p. 188) .... *adjuvans*
.... On *Chrysothamnus* (p. 189) .... var. *rowei*

Genotype *Aspidaphis adjuvans* (Walker) (synonym, *polygoni* Gillette) n. syn.

The Armoured Knotweed Aphid

Aphis adjuvans Walker, 1848b:2220.
Aspidaphis adjuvans, Laing, 1921:125; Theobald, 1927:310.
Aspidaphis polygoni Gillette, 1917c:196; Gillette and Palmer, 1932b:456.

Apterous Summer Vivipara. Pale yellow to pale bluish green; all appendages pale with tips of segments blackish. Body length 1.5-2; hind tibia .35-.50; hind tarsal II .12; antenna .35-.50. Dorsal surface of body rugose. Tergite VIII developed into large triangular shield extending well beyond the end of the cauda.

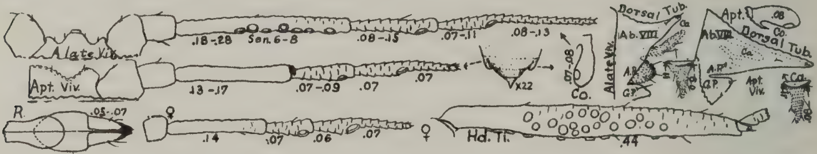

Fig. 218. *Aspidaphis adjuvans*

Alate Vivipara. Head and meso- and metathorax dusky brown; antenna and tarsi blackish; cornicle and cauda pale. Body length 1.4-2; hind tibia .55-.77; hind tarsal II, .12-.14; antenna .58-.85, III and IV coalesced; rostrum broadly obtuse, attaining between 1st and 2d coxae. Hairs blunt, minute and sparse. Eye without ocular tubercle. Cornicle clavate without flange, with opening on median side slightly before tip, smooth, recumbent against body, weak, hardly wider than antennal III. Cauda tapering acute, bearing 3 straight, short hairs .02 on each side. Lateral tubercles absent. Tergite VIII projecting about as far as tip of cauda.

Ovipara. Apterous. Color brownish or slightly rusty. Slightly shorter and more robust than apterous vivipara; otherwise the same. Hind tibia moderately swollen along middle and bearing 20 or more large, circular. rather flat sensoria.

Egg. Newly laid, bright green; later, black; shining. Size .73 by .26.

Collections. On underside of leaves of *Polygonum aviculare*. Colorado: Fort Collins and Boulder. Apterous summer viviparae April 27 to Oct. 10, alate viviparae June 19 to Aug. 4, oviparae Oct. 6; common.

Type. *Aspidaphis polygoni* Gillette, U.S.N.M., No. 41931. Paratypes Colo. Agr. Exp. Sta. Collection.

Laing (1921:125), after examination of typic specimens sent him by Gillette, writes "there seems to be no valid reason why the two species *(adjuvans* and *polygoni)* should not be the same."

Aspidaphis adjuvans sub. sp. *rowei* Knowlton and Smith

Aspidaphis adjuvans **sub. sp.** ***rowei*** **Knowlton and Smith, 1936g:777.**

This species is so close to *A. adjuvans* (Walker) (Syn. *A. polygoni* Gillette) that drawings and descriptions seem unnecessary. The differences as compared with Gillette's description of *polygoni* and paratype specimens are very slight and as follows: Longer hind tibia (.77 instead of .55-.63) and longer hind tarsal II (.15 instead of .11-.12), shorter cornicle (.06-.07 instead of .07-.08), fewer sensoria (4-5, instead of 6-8) on III of alate vivipara, different host plant *(Chrysothamus* instead of *Polygonum).* Indeed, if it were not for the radically different host plant it would hardly be advisable to give this form a separate name.

Furthermore, an alate specimen has been taken on *Polygonum* subsequent to the original description by Gillette, which agrees with the form from *Chrysothamnus* in tibial and tarsal length (the only appreciable distinction). Evidently either the *Chrysothamnus* form also occurs on *Polygonum* unless this instance was accidental or the two apparent forms are but variations of the same species. Biological experiments are needed for further evidence.

Collections. On *Chrysothamnus nauseosus* subsp. *nauseosus.* Utah: Kanosh and Clover. Alate vivipara May 3, oviparae Oct. 2.

Cotypes. Knowlton and C. F. Smith Collections.

Aspidaphis aquatica (Gillette and Bragg)

The Armoured Water Aphid

Siphocoryne aquatica **Gillette and Bragg, 1916:447.**
Aspidaphis aquatica, **Gillette and Palmer, 1932b:457.**

Apterous Summer Vivipara. Light yellowish green; heavily powdered ventrally; antenna blackish on distal half; cornicle and legs pale; cauda pale or dusky to blackish; legs appearing powdery. Tergite VIII projecting backwards nearly to tip of cauda and rather triangular and shield-shaped. Size of body 2.60 by .7-1; hind tibia .85-.90; hind tarsal II .17; antenna .85-.95, sensoria faint; rostral IV+V rather broad, barely attaining 2d coxa. Dorsum of body rugose. Hairs blunt, on hind tibia .02 long; not evident on body.

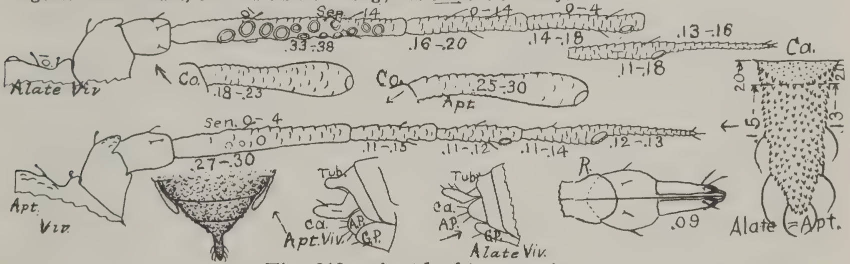

Fig. 219. *Aspidaphis aquatica*

Alate Vivipara. Head and thorax blackish; abdoment light yellowish green with dusky bands and blotches on most of segments, often coalesced into a dorsal patch on II to V inclusive. Body length 2; hind tibia .9-1; hind tarsal II .18; antenna 1.10, secondary sensoria irregular in size; rostrum attaining between 1st and 2d coxae. Hairs blunt or slightly capitate; on hind tibia .01 to .015; cornicle clavate, without flange and with opening towards median side of tip, faintly imbricated, weak and held against body, recumbent. Cauda parallel-sided to long-tapering, bearing 3 pairs of lateral hairs. Abdominal VIII with wartlike dorsal tubercle.

Collections. On leaves and stems of *Catabrosa aquatica,* often beneath the surface of the water. Colorado: Fort Collins and Denver. Alate and apterous viviparae all months of the year; common.

Type. U.S.N.M. Paratypes, Colo. Agr. Exp. Sta. Collection.

Genus **Atarsos** Gillette

Gillette, 1911a:440; Baker, 1920a:44; Gillette and Palmer, 1932b:458.

Characters. Frontal tubercles rudimentary. Antenna six-segmented, much shorter than body, secondary sensoria circular, numerous on III, IV and V. Hairs capitate. Both segments of tarsus entirely lacking on all legs and in all stages, tibiae ending in the ordinary pulvillus. Cornicle cylindrical with sudden constriction forming an encircling groove next to flange. Cauda tapering to a point. Fore wing with media twice-branched; hind wing with both media and cubitus present.

Genotype (monotypical), *Atarsos grindeliae* Gillette.

Chief distinguishing character is the absence of both segments of the tarsi on all legs in all forms. *Mastopoda* Oestlund lacks only tarsal II, has cornicle without flange and narrowed in middle and antenna is five-segmented.

Only one species represented in region.

Genotype *Atarsos grindeliae* Gillette

The Footless Grindelia or Gumweed Aphid

Atarsos grindeliae Gillette, 1911a:440; Gillette and Palmer, 1932b:459.

Fundatrix. Color and measurements as in summer apterous vivipara except the following: Body length 1.30-1.80; hind tibia .80-.85; antenna .80-.85, III +IV (coalesced) .32-.35, V .12-.13, VI .10+.10, secondary sensoria 11-14 on III+IV, 0-2 on V; cornicle .18. Otherwise as in summer aptera.

Apterous summer Vivipara. Pale yellow to pale green, shining; antenna, cornicle and tibiae pale proximally, black distally. Body length 1.05-1.55; hind tibia .50-.72; antenna .72-1.05; rostrum attaining between 2d and 3d coxae.

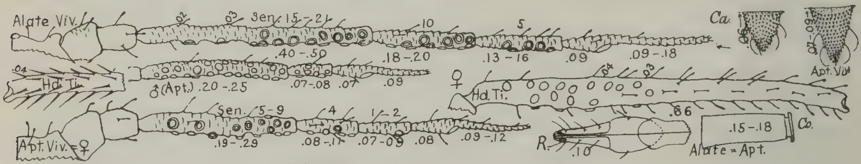

Fig. 220. *Atarsos grindeliae*

Alate vivipara. Head and thorax black; abdomen pale yellow to pale green: shining; with faint broken dusky dorsal dashes and lateral areas; appendages pale proximally to dusky distally; venation of wings rather heavy. Body length 1.6-2; hind tibia .80; antenna 1.12, secondary sensoria tuberculate, rostrum hardly attaining 2d coxa. Hairs capitate. Cornicle cylindrical, smooth, with distinct flange and with collarlike depression just before flange. Cauda tapering, acute, hardly longer than broad, bearing 2 pairs of hairs on each side and a single dorsal preapical one.

Ovipara. Apterous. Yellowish green shading to brown on head and tip of abdomen; shining; antenna dark brown; cornicle and tibiae light brown to dusky. Measurements as in summer apterous vivipara. Hind tibia slightly swollen on proximal half and bearing about 18 rather large sensoria.

Male. Apterous. Color same as in ovipara. Body length .90; hind tibia .40-.50; antenna .55-.55, III and IV coalesced.

Egg. Newly laid, colorless; later, black; shining. Length .60, width .30.

Collections. On leaves of *Grindelia squarrosa* and *Aster leucanthemifolius.* Colorado: Fort Collins. Fundatrices April 16 to May 11, apterous summer viviparae April 26 to Aug. 22, alate viviparae May 3 to June 23, sexuales Sept. 29 to Oct. 24; rather common.

Type. U.S.N.M., No. 41932. Paratypes, Colo. Agr. Exp. Sta. Collection.

Genus **Brachycolus** Buckton

Buckton, 1879:146; Baker, 1920a:45.

Characters. Body long and narrow. Vertex rather flat; frontal tubercles not developed. Cornicle very short hardly more than a pore. Antenna six-segmented; secondary sensoria circular. Legs short; tarsal II rather long. Fore wing with radial sector but slightly curved. Hairs pointed and inconspicuous. Genotype, (monotypical), *Aphis stellariae* Hardy.

Key to Species of Brachycolus

1. Rostral IV+V .07 long, not attaining 2d coxa.. 2
.... Rostral IV+V .12 long, surpassing 2d coxa (p. 191)..*tritici*
2. Unguis not shorter than III (p. 191)..*stellariae*
.... Unguis shorter than III (p. 191)..*holci*

Brachycolus holci Hardy

Aphis holci Hardy, 1850:531.
Brachycolus holci, Buckton, 1879:147 (in part).
Brachycolus stellariae (Hardy), (misidentification), Gillette and Palmer, 1932b:460.
Holcaphis holci, Hille Ris Lambers, 1939:99.

Apterous Summer Vivipara. Pale yellowish or greenish with dusky parts as in alate vivipara. Body length 1.8; hind tibia .45; antenna .63; rostrum, hardly attaining 2d coxa.

Alate Vivipara. (Cleared and mounted), head and thorax dark; abdomen immaculate; appendages, cauda and anal plate dusky. Body length 1.30; hind tibia .60; hind tarsal II .15; antenna .70-.80, secondary sensoria convex. Hairs pointed, very sparse and inconspicuous. Cornicle slightly raised, truncate, without flange. Cauda tapering, rather blunt, bearing 2 hairs on each side and 1 or 2 preapical ones.

Ovipara. Apterous. (Mounted in balsam), head dark; body without marking; dusky parts as in alate vivipara; with hind tibia slightly swollen on proximal half and bearing rather numerous sensoria.

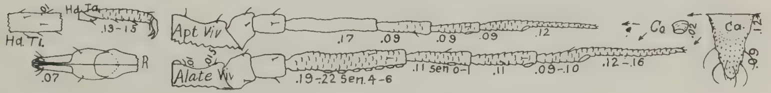

Fig. 221. *Brachycolus holci*

Collections. On grass. Colorado: Fort Collins and Boulder. Apterous summer viviparae Aug. 19, alate viviparae May 31 and June 3, oviparae Nov. 20; apparently rare.

Description and figures from specimens determined by Hille Ris Lambers.

[Genotype *Brachycolus stellariae* (Hardy)]

Aphis stellariae Hardy, 1850:788.
Brachycolus stellariae, Buckton, 1879:147; Theobald, 1927:313; Hille Ris Lambers, 1939:97.

Apterous Summer Vivipara. (Cleared and mounted), body immaculate; head dusky; antenna, cauda, anal plate, tarsi, tips of tibiae and of rostrum dusky. Body length 1.4; hind tibia .50; hind tarsal II .12; antenna .80, III .15-.19, IV .08-.10, V .09-.11, VI .08+.23-.25; cornicle .02, rostral IV+V broad, .07 long, attaining 2d coxa; cauda tapering, with 2 pairs of lateral hairs, .08 long on median line, .12 on side.

Alate Vivipara. (Cleared and mounted), head and thorax dusky; abdomen immaculate; appendages, cauda, anal plate and distal portion of rostrum dusky. Body length 1.30, hind tibia .70-.73; hind tarsal II .12; antenna 1.10-1.20, III .28-.33, IV .18, V .15-.19, VI .10+.26-.37; cornicle, on abdominal V according to Hille Ris Lambers (op. cit.), .03 long; cauda .08 on median line, .12 on side, with 2 pairs of lateral hairs and one dorsal preapical one.

Host. On leaves of *Stellaria* sp., causing distortion of leaf tufts. (Not taken in region.)

Data for above description obtained from study of specimens determined by Hille Ris Lambers and from description by Theobald (op. cit.).

Brachycolus tritici Gillette

The Western Wheat Aphid

Brachycolus tritici Gillette, 1911a:441; Gillette and Palmer, 1932b:461.

Apterous Summer Vivipara. Head dusky; rest of body pale yellowish to greenish; heavily powdered; distal half of antenna, most of rostrum, legs, cauda and anal plate dusky to blackish; cornicle usually slightly dusky. Body length 1.15-1.88; hind tibia .43-.55; antenna .59-.70; rostral IV+V long, slender, attaining 2d coxa.

Alate Vivipara. Head and thorax black; abdomen pale yellowish to pale green; slightly powdery; wing veins black; antenna except proximal part of III, tarsi, tips of tibiae, cauda and anal plate black; cornicle yellowish or brownish. Body length 1.3-1.5; hind tibia .55-.65;

antenna .70-.80, secondary sensoria arranged in irregular row on III. Hairs pointed, very sparse. Cornicle merely slightly raised pore located on abdominal VI. Cauda tapering, acute, bearing 2-3 hairs on each side and a single preapical one. Lateral tubercles not evident. Tarsal II long and slender. Fore wing with radial sector nearly straight.

Ovipara. Apterous. Same as apterous vivipara except that hind tibia is slightly swollen and bearing a few inconspicuous sensoria.

Male. Apterous. More yellow and less powdery than the females. Body length 1.10, width .40; length of antenna same or shorter than in apterous vivipara; hind tibia .40.

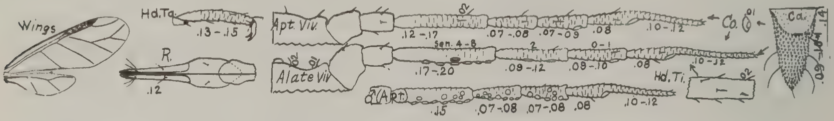

Fig. 222. *Brachycolus tritici*

Collections. On leaves of wheat *(Triticum vulgare)* and *Agropyron* sp. Colorado: Boulder and Fort Collins. Apterous summer viviparae May 5 to Oct. 12, alate viviparae May 12 to July 18, sexuales Oct. 12; rather rare.

Type. U.S.N.M., No. 41934. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Slender rostral IV+V .12 long, attaining 2d coxa and rather slender tapering cauda, twice as long as wide.

Genus **Braggia** Gillette and Palmer

Gillette and Palmer, 1929a:28 and 1932b:461.

Characters. Vertex slightly rounded; frontal tubercles but slightly developed. Antenna six-segmented; short, about half as long as body, unguis about same length as base of VI. Cornicle tapering with wide flange. Cauda broadly semi-circular to triangular resembling a body segment. Hairs on body heavy, spinelike or cylindrical and blunt, most conspicuous in life. Other characters as in genus *Aphis.*

Chief Distinguishing Characters. Heavy blunt hairs and peculiar, broad, semicircular cauda resembling that of nymph.

Genotype (monotypical), *Braggia echinata* Gillette and Palmer.

Key to Species of Braggia

1. Body hairs blunt, cylindrical, heavy, .03-.04 long (p. 192)........*echinata*
.... Body hairs sharp to slightly blunt, .06-.07 long (p. 193)........*uncompahgrensis*

Genotype *Braggia echinata* Gillette and Palmer

(Plate V, 12-15)

Braggia echinata Gillette and Palmer, 1929a:29 and 1932b:462.

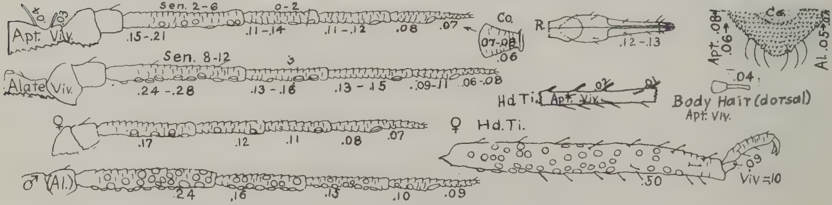

Fig. 223. *Braggia echinata*

Apterous Summer Vivipara. Grayish olive-green usually with slight rusty area at base of each cornicle; dorsum of body covered with pattern of reticulation marked with white secretion and bearing heavy, blunt, white hairs which give a frosted appearance in life; appendages pale proximally, dusky distally; cauda and anal plate pale; genital plate slightly dusky. Body length 1.87; hind tibia .50-.55; hind tarsal II .09; antenna .70, secondary sensoria irregular in size.

Alate Vivipara. Head and thorax blackish; abdomen yellowish olive-green with dusky lateral areas and with white, blunt, heavy hairs, giving a slight frosted appearance, especially on VII and VIII; legs mostly pale; cornicle dusky. Body length 1.40; hind tibia .47-.60; antenna .75, secondary sensoria slightly convex to flat; rostrum slender, obtuse, attaining between 2d and 3d coxae. Hairs heavy and blunt, somewhat resembling capitate hairs in life, most conspicuous on posterior segments; on antenna very sparse and inconspicuous; on cauda pointed, curved, .03-.04 long. Cornicle conical, truncated, with large flange, faintly imbricated. Cauda broadly semicircular, resembling a body segment, bearing 3 pairs of lateral hairs. Lateral tubercles present.

Ovipara. Color similar to apterous vivipara except that appendages are darker, hind tibia entirely dusky brown. Body length 1.62; hind tibia .50; cornicle .05; otherwise as in apterous vivipara except hind tibia blackish and moderately swollen for nearly entire length and bearing rather large flat sensoria scattered over most of length.

Male. Alate. Head and thorax dark brown to black; abdomen pinkish to dark rusty brown; antenna dusky to black; tibiae sordid yellowish with tips and tarsi black. Body length 1-1.40; hind tibia .55; antenna .80. Otherwise as in alate vivipara.

Collections. On leaves and stems of *Eriogonum* sp. Colorado: Fort Collins. Apterous summer viviparae June 7 to Oct. 7, alate viviparae July 8 to Oct. 17, sexuales Oct. 6 to 17; rather rare.

Type. U.S.N.M., No. 41468. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Character of hairs, especially in aptera (heavy, blunt, white, .01-.04 long), semilunar shape of cauda and its width (so broad as to resemble a body segment especially in aptera), truncate-conical but not mammiform shape of cornicle.

Braggia uncompahgrensis Hottes

Braggia uncompahgrensis Hottes, 1950:18.

Apterous Fall Vivipara. "Gray-green; with slight frosty pulverulence partly due to hair." (Mounted in balsam), body pale; appendages pale except tips of tibiae, cornicle, rostrum, antenna, cauda and anal and genital plates, which are dusky; tarsi and sometimes cornicle dusky. Body length ".858"-1.1-1.4; across eyes .29-.32; hind tibia .49-.55; hind tarsal II .07-1; antenna .55-.70, III .15-.19, IV .11-.14, V .13, VI .08-.09+.07-.09, sensoria 1-2-"4" on III, 0-"2" on IV; cornicle .05-".08"; rostral IV+V .10-.12, attaining between 2d and 3d coxae; cauda broad and semicircular to triangular, .04-.06 on median line, .06-.08 on side, bearing 3 hairs on a side. Hairs on body heavy-spinelike, sharp to blunt, .05-.07 long; on vertex fine, pointed, .05-.06; on antenna and hind tibia very short, fine and sparse, hardly visible.

Alate Vivipara. Head and thorax "pale dusky to rather dark dusky brown; abdomen gray-green with slight frosty pulverulence not due to hairs"; appendages pale becoming dusky distally. Body length ".829" to 1; across eyes .30; hind tibia .60; hind tarsal II .09; antenna .90, III .25, IV .14, V .14, VI .09+.09; cornicle ".50"-.07; cauda .05; rostral IV+V .12, attaining between 2d and 3d coxae. Cornicle truncated-conical, with large flange and with faint cross imbrications. Cauda broad, triangular, resembling anal plate, bearing 2-3 pairs of lateral hairs. Hairs on body pointed, fine, .02-.03 long and sparse; on antenna and hind tibia minute and very sparse. Lateral tubercles present.

Ovipara. Apterous. Color "as in apterous vivipara or bronze-green." Measurements same as in apterous vivipara. Hind tibia blackish, considerably swollen along nearly entire length and bearing numerous sensoria.

Male. Alate. "Head and thorax dusky brown; abdomen light green." Body length 1.25; antenna 1, III .25, IV .20, V .17, VI .10+.10, sensoria about 24 on III, about 15 on IV, about 10 on V, "0 to 2" on VI.

Collections. On *Eriogonum corymbosum.* Colorado: Gateway. Apterous viviparae Oct. 1 to 19, alate viviparae Aug. 27, sexuales Oct. 19; rare.

Type. U.S.N.M. Paratypes, Colo. Agr. Exp. Sta. and Hottes Collections.

Chief Distinguishing Characters. Characters of body hairs (heavy-spinelike, varying from sharp to blunt, not uniformly blunt) and length of these hairs (longer than .05).

This species is rather doubtfully distinct from *B. echinata.* Not figured since, except for hairs, it would be almost a repetition of that for *B. echinata.*

Genus **Brevicoryne** van der Goot

Van der Goot, 1915:245; Das, 1918:179; Baker, 1920a:45.

Characters. Body oval, lacking lateral tubercles on abdominal I and VII. Vertex moderately convex; frontal tubercles not distinctly exceeding vertex. Hairs pointed. Cornicle clavate, short, at most 3 times as long as broad, not distinctly longer than cauda. Cauda tapering, never distinctly shorter than cornicle. Other characters as in *Rhopalosiphum;* separated from the latter only by the short cornicle, shorter than the hind tarsus and not longer than cauda. Genotype (monotypical), *Aphis brassicae* Linnaeus.

Key to Species of Brevicoryne

1. Unguis hardly longer than base of VI (p. 194)............*fraterna*
.... Unguis twice or more times as long as base of VI............ 2
2. III at least as long as IV+V, secondary sensoria absent on IV and V in alata (p. 194)............*brassicae*
.... III shorter than IV+V, secondary sensoria present on IV and V in alata (p. 195)............*symphoricarpi*

Genotype *Brevicoryne brassicae* (Linnaeus)

The Cabbage Aphid

Aphis brassicae Linnaeus, 1758:452; Herrick and Hungate, 1911:717.
Brevicoryne brassicae, van der Goot, 1915:246; Theobald, 1927:45; Gillette and Palmer, 1932b:463.

Apterous Summer Vivipara. Head dark brown, rest of body pale greenish with broken traces of dorsal bands on abdomen; powdery; otherwise as in alate vivipara. Body length 1.8-2.15; hind tibia 1.15-1.25; antenna 1.2-1.9; rostrum barely attaining 2d coxa.

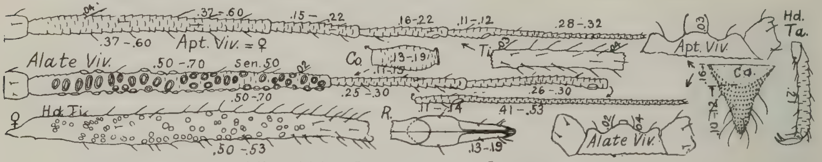

Fig. 224. *Brevicoryne brassicae*

Alate Vivipara. Head and thorax black; abdomen pale greenish with broken dashes of dusky and with dusky lateral areas; appendages, cauda, anal plate and cornicle dusky. Body length 2-2.3; hind tibia 1.4; antenna 2, secondary sensoria with distinct margins, somewhat tuberculate; rostrum not attaining 2d coxa. Hairs pointed. Cornicle swollen, slightly wider at middle than hind tibia. Cauda tapering, acute, bearing 2 pairs of lateral and one pair of dorsal hairs.

Ovipara. Apterous. Color same as apterous vivipara or more yellow and legs paler. Body length 2; antenna .83-1.20; hind tibia moderately swollen and bearing small, rather sparsely scattered sensoria throughout almost entire length.

Male. Alate. Body length 1.40; hind tibia .90; hind tarsal II .18; antenna 1.50, III, IV and V bearing numerous sensoria.

Collections. On cabbage *(Brassica oleracea)*, cauliflower *(B. o.* var. *botrytis)* and radishes *(Raphanus sativa).* Throughout region. Fundatrices Feb. 3 to April 8, apterous and alate viviparae every month in the year, males Oct. 27 to Dec. 6, oviparae Nov. 13 to Feb. 21; common and injurious.

Brevicoryne fraterna (Strom)

Aphis fraterna Strom, 1938:473.
Brevicoryne salixutis Smith and Knowlton, 1940:405 and 1943:175 (synonymy).

Apterous Summer Vivipara. Pale green to yellow-green; all appendages pale, except tips of tibiae, entire tarsi and distal third to half of antenna. Body length 1.2-1.45-"1.75"; across eyes .35-.47; antenna .53-.73; hind tibia .45-.57-".72"; rostrum attaining between 2d and 3d coxae.

Alate Vivipara. (From description by Strom). Color as in aptera. Body length 1.1; across eyes .35; antennal III .14 with 3 sensoria, IV .07, V .08, VI .07+.065; cornicle .12, somewhat swollen and with marked constriction just preceding flange; rostrum attaining 3d coxa. Cauda tapering bearing 2-3 hairs on each side.

Ovipara. Apterous. Pale yellowish or clay-color; with blackish patches or bands on entire dorsum; appendages and cornicle pale except tips. Body length 1.35-1.9; across eyes .45-.49; antenna .57-.70; hind tibia .55-.65, swollen slightly on middle portion and bearing numerous rather large sensoria.

Male. Apterous. Entire dorsum blackish, appendages and cornicle as in ovipara. Body length 1-1.1; across eyes .35-.40; antenna .57-.70; hind tibia .50-.55; rostrum as in ovipara.

Egg. Greenish when newly laid; later, black.

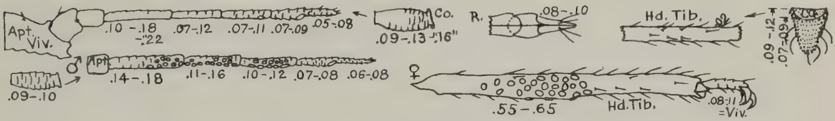

Fig. 225. *Brevicoryne fraterna*

Collections. On leaves and tender twigs of willow *(Salix* sp.*)*. Utah: Mouth of Logan Canyon. Colorado: Fort Collins. Apterous summer viviparae April 29 to July 22; sexuales Oct. 19 to 25; rare.

Chief Distinguishing Characters. Size of body (shorter than 2), short antenna (shorter than .75 and much shorter than body) and number of sensoria on III in alate vivipara (about 3).

Type. Ill. Nat. Hist. Surv. Collection. Paratypes, L. G. Strom Collection.

Brevicoryne symphoricarpi (Thomas)

The Snowberry Aphid

Aphis symphoricarpi Thomas, 1877:12; Hottes and Frison, 1931a:438 (synonymy).
Aphis albipes Oestlund, 1887:52.
Brevicoryne symphoricarpi, Gillette and Palmer, 1932b:464.

Fundatrix. Medium or brownish green; head and areas about cornicles brownish; appendages and cauda mostly pale; cornicle blackish. Size 2.50-2.70 by 2; hind tibia .78; antenna .60-1.10, six-segmented.

Apterous Summer Vivipara. Young Fundatrigenia. Newborn, pale yellow; with orange about base of each cornicle and brownish on head; appendages and cornicle pale. *Adult.* Black or dusky green with powdery white cross dashes on abdominal I, IV, V and VIII; appendages mostly pale; cauda dusky; cornicle and anal plate black. Dorsum of body reticulated. Body length 2-2.8*; hind tibia 1.2; antenna 2.4.

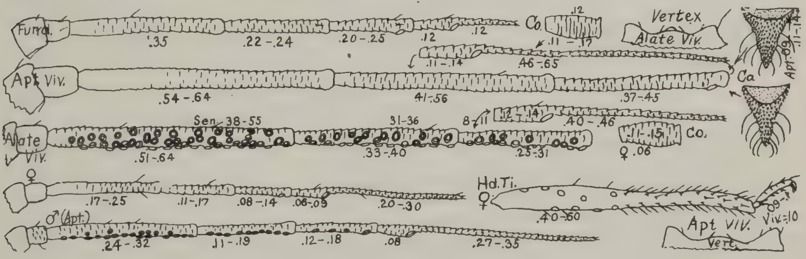

Fig. 226. *Brevicoryne symphoricarpi*

Alate Vivipara. Head and thorax brownish black; abdomen dusky green with black dorsal bands; antenna and cornicle blackish; cauda pale to dusky; legs mostly pale with tarsi and tips of tibiae black. Body length 1.5-2; hind tibia 1.2; antenna 1.6-2, secondary sensoria tuberculate, with broad margins; rostral IV+V.13, hardly attaining 2d coxa. Other measurements as in apterous vivipara. Hairs on antenna sparse and inconspicuous. Cornicle slightly swollen, with indistinct flange; imbricated. Cauda elongate-tapering, with but slight tendency to constriction near base, bearing 4-5 hairs on each side. Lateral tubercles well developed.

Ovipara. Nymph. Head dusky brown, rest of body yellow-brown; marked with powdery white on dorsolateral crossbands on abdominal I and IV and bands on VII and VIII; appendages pale. *Adult.* Apterous. Head and thorax mostly dusky; rest of body sordid greenish yellow with white markings; appendages as in nymph. Body length 1.0-1.25; antenna 1.0; cornicle about .06; cauda .05 on median line. Hind tibia slightly swollen on proximal half and bearing about 6 large circular flat sensoria.

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*One collection of over 12 apterous viviparae taken Aug. 31 measure only 1. No difference in structural characters has been detected.

Male. Apterous. Head and thorax dusky; abdomen pale green with broken dorsal crossbands and lateral areas; antenna and cornicle blackish; legs mostly pale. Body length 1.25; hind tibia .60; cornicle .06; antenna 1.25, bearing numerous sensoria on III, IV and V.

Egg. Newly laid, pale yellow; later, black. Size .60 by .26.

Collections. On twigs of *Symphoricarpos occidentalis* and *S. rotundifolia,* curling leaves. Colorado: Foothills near Fort Collins, La Porte, Bellvue, Boulder and Colorado Springs. Utah: Logan, Smithfield and American Fork Canyons. Fundatrix May 13, summer apterous viviparae May 13 to Sept. 23, alate viviparae May 13 to July 1, sexuales Sept. 23 to Oct. 11; fairly common.

Cotypes. Ill. Nat. Hist. Surv. Collection, Nos. 2792 and 8776.

This species is the genotype of *Thargelia* Oestlund (1922:127). The characters, however, in the opinion of the author, are congeneric with *Brevicoryne brassicae.*

Genus **Cavariella** Del Guercio

Del Guercio, 1911a:323; Baker, 1920a:46; Theobald, 1927:3.

Characters. Vertex convex; frontal tubercles indistinct. Antenna six-segmented, bearing prominent circular secondary sensoria in alate vivipara. Cauda tapering. Cornicle with flange, opening on tip. Abdomen with supracaudal process on VIII; most prominent in aptera. Venation as in genera *Rhopalosiphum* and *Aphis.*

Genotype (fixed by Del Guercio, 1911), *Aphis pastinacae* Linnaeus.

Key to Species of Cavariella

1.	Cornicle cylindrical, hardly clavate (p. 198)	*theobaldi*
....	Cornicle distinctly clavate	2
2.	Supracaudal process in aptera knoblike, much shorter than cauda; antenna with unguis 1.5 times base of VI or longer	4
....	Supracaudal process in aptera triangular to fingerlike, as long as cauda; antenna with unguis shorter than 1.5 times base of VI	3
3.	IV in alata without secondary sensoria (p. 196)	*aegopodii*
....	IV in alata with secondary sensoria (p. 198)	*hendersoni*
4.	Unguis not longer than 1.5 times base of VI (p. 198)	*pastinacae*
....	Unguis at least as long as 3 times base of VI (p. 197)	*essigi*

Cavariella aegopodii (Scopoli)

Aphis aegopodii Scopoli, 1763:399.
Rhopalosiphum capreae Fabricius, (misidentification), Gillette, 1911b:320; Theobald, 1927:10.
Cavariella aegopodii, Hottes and Frison, 1931a:229.
Cavariella capreae, Gillette and Palmer, 1932b:466.

Fundatrix. Head rusty brown; rest of body rusty red; appendages and cornicle pale, with tips of antenna and of tarsi black; cauda concolorous with body. Body length 1.80-2; antenna .50-.66, III+IV (coalesced) .22-.27, V .10, VI .10+.06 or in some, entire length of antenna .75, III .21, IV .08-.11, V .08-.11, VI .10-.11+.08-.10; hind tibia .60-.70; cornicle .40. Otherwise as in summer vivipara.

Apterous Summer Vivipara. Pale green; cornicle, cauda and legs pale to slightly dusky. Body length 1.85-2.15; supracaudal process triangular to fingerlike; hind tibia .70-.85; hind tarsal II .14; antenna .82-.95; rostrum attaining 2d coxa. Dorsal integument shagreened or punctate.

Alate Vivipara. Head and thorax black; abdomen pale grass-green, with dark lateral areas and dorsal bands, beginning on abdominal III and more or less coalesced on III, IV and V; cornicle and cauda light dusky; antenna black; legs mostly pale with tarsi and tips of tibiae black. Body length 1.2-2; hind tibia .80-.95 antenna 1-1.10, sensoria rather tuberculate. Hairs blunt, sparse; on vertex and antenna .01-015; on tibia .01. Cornicle clavate, at middle wider than hind tibia, transversely rugose proximally, faintly imbricated distally, with flange somewhat oblique. Dorsal tubercle on abdominal VIII short, blunt, bearing 2 hairs at tip. Cauda bluntly tapering, bearing 2 pairs of lateral hairs.

Ovipara. Apterous. Rusty brown; cornicle and appendages pale to colorless, except tarsi and tips of antenna and of tibiae black, hind tibia on almost entire length, black. Body length 1.10-1.70; antenna .60-.90; with hind tibia distinctly swollen and bearing numerous small sensoria along almost entire length.

Male. Alate. Dusky yellowish brown with blackish dorsal bands and lateral areas on abdomen; antenna blackish; legs, cornicle and cauda brownish to dusky except tarsi and tips on tibiae which are black. Measurements as in alate vivipara. Sensoria present and numerous on III, IV and V.

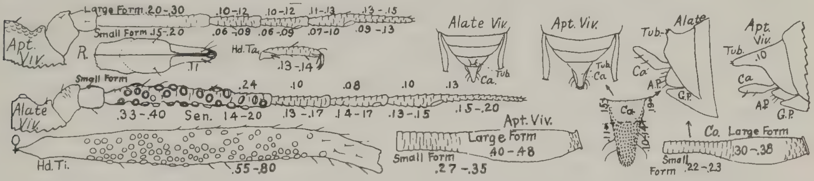

Fig. 227. *Cavariella aegopodii*

Small Form. Apparently differing only in smaller size, taken in several collections in Utah. Measurements as follows: *Apterous Summer Vivipara.* Body length 1.25-1.5; hind tibia .50-.68; hind tarsal II .10-.11; antenna .55-.63; rostral IV+V .10-.11, attaining 2d coxa; cauda .08-.10 on median line; dorsal tubercle on abdominal VIII .12. *Alate Vivipara.* Body length 1; antenna .65. Otherwise as in apterous vivipara except dorsal tubercle on abdominal VIII shorter and as figured.

Collections. On winter host, on leaves and twigs of willow *(Salix* sp.*);* on summer hosts, leaves of *Ligusticum porteri* and the following Umbelliferae: Dill *(Anethum graveolens),* celery *(Apium graveolens), Berula erecta,* caraway *(Carum petroselinum),* water hemlock *(Cicuta douglasi),* carrot *(Daucus carota),* cowparsnip *(Heracleum lanatum)* and parsnip *(Pastinaca sativa).* Throughout region. Fundatrices March 16 to 19 on *Salix* sp., apterous summer viviparae March 9 to Dec. 6 and alate viviparae June 10 to Dec. 6 on Umbelliferae, sexuales Oct. 19 to Nov. 1 on *Salix* sp.; rather common.

Chief Distinguishing Character. Short unguis (not markedly longer than base of VI) and length of IV and V about same as base of VI and unguis respectively.

Determination of this species was aided by study of specimens determined by Hille Ris Lambers.

Cavariella essigi (Gillette and Bragg)

Hyadaphis pastinacae (Linnaeus), (misidentification), Essig, 1911c:534.
Siphocoryne essigi Gillette and Bragg, 1918a:94.
Cavariella essigi Gillette (erroneous, for Gillette and Bragg) Gillette and Palmer, 1932b:467.

Apterous Summer Vivipara. Light green; appendages pale. Body length 2-2.2; hind tibia 1.2; antenna 1.07; rostrum attaining 2d coxa. Dorsal integument shagreened.

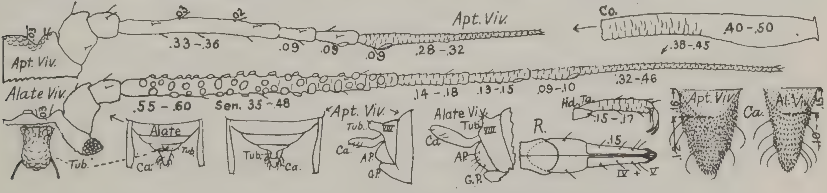

Fig. 228. *Cavariella essigi*

Alate Vivipara. Head and thorax black; abdomen pale yellowish green to bluish green; with dusky dorsal dashes and lateral areas on abdomen; all appendages, cauda and cornicle pale to slightly dusky. Body length 1.9-2.1; hind tibia 1.3-1.4; antenna 1.4-1.6, secondary sensoria irregular in size, strongly tuberculate. Hair slightly capitate; on hind tibia .02-.03. Cornicle slightly clavate, with flange and transversely wrinkled proximally. Cauda tapering and bearing 3-4 hairs on each side.

Collections. On winter host, on leaves of willow *(Salix laevigata);* on summer host, on leaves of cowparsnip *(Heracleum lanatum).* Colorado: Eldora, Cameron Pass and Fort Collins. Utah: Spring Hollow and Logan. Idaho: Fish Haven. Apterous and alate viviparae from June 18 to Aug. 21; rather common.

Type. U.S.N.M., No. 59909.

This species is very close to *C. pastinacae* (Linnaeus) according to Theobald but differs from Theobald's description (1927:13) as follows: Length of antenna of apterous vivipara (half, not third of length of body), length of cornicle of apterous vivipara (longer than III+IV, not "nearly equal"), length of cornicle of alate vivipara (3 times cauda, not "twice") and length of unguis (3-4, not 1.5, times length of base of VI).

Cavariella hendersoni Knowlton and Smith

Cavariella hendersoni Knowlton and Smith, 1936g:776.

Alate Vivipara. (Mounted on slide), head and thorax black; abdomen with dorsal bands, coalescing on III, IV and V, short dashes on VI and VII and ventral dashes on I, IV and VIII black; antenna except base of III, tips of tibiae, entire tarsi, cornicle, cauda and terminal segments of rostrum blackish to black. Body length 1.70-1.90; across eyes .35-.40; antenna .90-.95; hind tibia .75-.80; rostrum attaining 2d coxa.

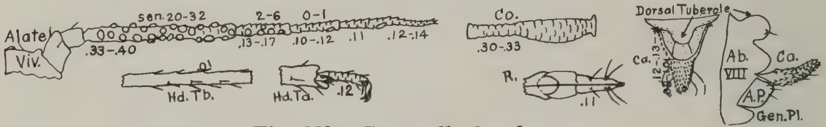

Fig. 229. *Cavariella hendersoni*

Collections. On willow *(Salix* sp.*)*, on leaves. Utah: Hooper, Ogden and West Webber. Alate viviparae June 7 to October 3; rare.

Chief Distinguishing Character. Presence of sensoria on IV.

Type: Knowlton Collection. Paratypes, U.S.N.M.

[Genotype *Cavariella pastinacae* (Linnaeus)]

Aphis pastinacae Linnaeus, 1758:451 and 259 and 1767:734.
Cavariella pastinacae Theobald, 1927:13.

Apterous Summer Vivipara. (On *Salix)* green to yellowish green; appendages pale to dusky. Body length 1.8-2; antenna not reaching 2d coxa, III longest, not quite as long as IV+V+VI, IV less than third of III and a little longer than V, VI equal to IV+V; base of VI a little longer than IV; unguis 1.5 times base; rostrum attaining to or past 2d coxa; cornicle nearly equal to III+IV; cauda half as long as cornicle, bearing 3 hairs on each side; legs short and thick. Dorsal body surface shagreened.

Alate Vivipara. Head and thorax black; abdomen yellowish green with dark dorsal patch or transverse bands; antenna deep brown; cornicle dusky at apex, paler at base; tarsi and tips of tibiae brown. Body length 2.5; antennal III much the longest, IV and V nearly equal, base of VI not half of V, unguis as long as IV+V+base of VI, secondary sensoria markedly tuberculate, on III only. Cornicle clavate. Supracaudal process prominent but small, knoblike, bearing 2 apical hairs. Cauda thick, bearing 3 hairs on each side.

Hosts. Willow *(Salix* sp.*)*, parsnip *(Pastinaca sativa)*, carrot *(Daucus carota)* and many wild *Umbelliferae.*

Data for above description obtained from description by Theobald (1927:13). (Not recorded from region.)

Cavariella theobaldi (Gillette and Bragg)

Aphis theobaldi Gillette and Bragg, 1918a:92.
Cavariella theobaldi, Gillette and Palmer, 1932b:468.

Apterous Summer Vivipara. Yellowish or pale greenish; cornicle and cauda yellowish; antenna pale except VI and tip of V; legs pale with tarsi and tips of tibiae blackish. Body length 1.60-2; hind tibia 1; antenna 1.20. Dorsal integument shagreened.

Alate Vivipara. (Mounted on slide), head and thorax blackish; abdomen pale with dorsal bands and lateral areas dusky; antenna dark; cornicle and cauda pale dusky; legs mostly pale. Body length 1.50-2; hind tibia 1.10; antenna 1.15-1.50, secondary sensoria tuberculate and strongly convex; rostrum attaining between 2d and 3d coxae. Hairs blunt, drooping, sparse,

.02-.03 long on hind tibia; cornicle cylindrical to slightly tapering and gently curved outward, imbricated and with distinct flange. Cauda tapering, bearing about 3 hairs on each side and one dorsal preapical one. Fore wing with 2d fork of media sometimes obsolete.

Collections. On leaves and twigs of willow *(Salix* sp.*)*, as winter host; celery *(Apium graveolens)*, as summer host. Utah: Big Cottonwood Canyon. Collections taken in Colorado Springs, Colorado June 22 and Oct. 19 may possibly be fundatrices and oviparae respectively. Alate and apterous summer viviparae taken in New York at Geneva and Albany and in Massachusetts at Webster June 19 to July 1; evidently rare in region.

Type. U.S.N.M., No. 41938. Paratypes, Colo. Agr. Exp. Sta. Collection.

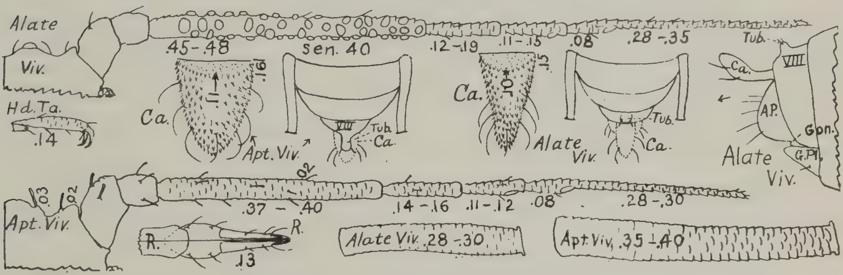

Fig. 230. *Cavariella theobaldi*

This name is given by Theobald (1927:171) as a synonym of *Aphis saliceti* Kaltenbach. Theobald was undoubtedly judging from his own material, a mixture of *A. saliceti* and *Cavariella capreae* used for article (1912:84) to which Gillette refers in his original description as apparently the same. However, since Gillette's description was from actual specimens taken in America presenting this combination of characters, the species surely must stand independently of errors in Gillette's interpretation of Theobald's material abovementioned.

There seems to be a very close resemblance to *Cavariella umbellatorum* (Koch) as described by Theobald (1927:15) but in the alate vivipara antennal IV is figured as more than third of the length of III, and IV+V exceeds three-fourths of III, while in *C. theobaldi,* IV is usually less than third of III, and IV+V is equal to only half to two-thirds of III; the cornicle in the alate vivipara in Theobald's and Koch's descriptions exceeds two-thirds of III, while in Gillette's species it does not exceed two-thirds. Until further study shows these differences to be invalid it seems that the species must be considered as distinct.

Genus **Durocapillata** Knowlton

Knowlton, 1927c:229.

Characters. Frontal tubercles moderately developed, not attaining vertex. Cornicle cylindrical, with prominent flange immediately preceded by abrupt encircling constriction. Hairs prominent, capitate to blunt on body and appendages. Cauda tapering. Secondary sensoria circular. Wing venation typical for Aphina.

Genotype (monotypical), *Durocapillata utahensis* Knowlton.

Only one species represented in region.

Genotype *Durocapillata utahensis* Knowlton

Durocapillata utahensis Knowlton, 1927c:229 and 1929a:7.

Apterous Summer Vivipara. "Yellow-green; shiny." (Mounted in balsam), pale with antenna cornicle, tarsi and tips of tibiae slightly dusky ("black" in life); cauda and remainder of legs pale. Body length 1.3-1.45; across eyes .35-.40; antenna .75-1.10; hind tibia .60-.85; rostrum attaining near 3d coxa.

Alate Vivipara. "Yellow-green; shiny"; appendages and cornicle blackish; cauda and anal plate concolorous with body; wing veins distinct and brownish black. Body length 1.30; across eyes .38; antenna 1.25-1.30; hind tibia .85; rostrum attaining 3d coxa. Hairs on body, and appendages capitate to blunt.

Ovipara. Apterous. Color as in vivipara. Body length 1.-1.60; antenna .60-.90; hind tibia .45-.70; proximal half slightly swollen and bearing about 19 rather large sensoria.

Male. Apterous. Color similar to vivipara. Body length .95; across eyes .37; antenna .85; hind tibia .60.

Egg. "Newly laid, whitish yellow; later, greenish yellow to bright green and finally shining black. Size .70-.80 long. Placed on scales below flower heads and on twisted leaves."

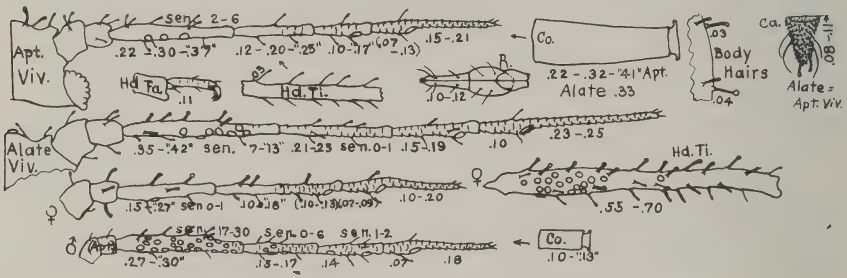

Fig. 231. *Durocapillata utahensis*

Collections. On *Chrysothamnus viscidiflorus,* curling leaves and twisting tender tips. Utah: Throughout state. Idaho: Indian Massacre Rocks, Emigration Canyon and Preston. Alate and apterous summer viviparae July 5 and 18, apterae June 10 to Sept. 21, oviparae Sept. 22 to Oct. 17, apterous males Sept. 27; not common.

Cotypes. U.S.N.M., and Utah Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Shape of cornicle, inconspicuous frontal tubercles.

Genus **Epameibaphis** Oestlund

Oestlund, 1922:132; Gillette and Palmer, 1932b:470.

Characters. Frontal tubercles absent; vertex nearly flat. Secondary sensoria circular. Cornicle cylindrical with conspicuous knoblike flange. Hairs blunt to capitate on body. Cauda tapering. Wing venation as in genus *Aphis.* Genotype (monotypical), *Aphis frigidae* Oestlund.

Key to Species of Epameibaphis

1. Cornicle black in viviparae (p. 200)....................*atricornis*
.... Cornicle pale in viviparae....................2
2. Cornicle .40-.53; III bearing sensoria in aptera (p. 201)....................*frigidae*
.... Cornicle .29-.40; III not bearing sensoria in aptera (p. 202)....................*utahensis*

Epameibaphis atricornis Gillette and Palmer

Epameibaphis atricornis Gillette and Palmer, 1933:348; Knowlton and Smith, 1936d:90; Palmer, 1936b:740.

Alate Vivipara. Head and thorax brown to black; abdomen medium brown with dusky lateral areas and dorsal bands which are broken on segments 1 to V; antenna except base of III, cornicle and entire legs black; cauda and anal and genital plates slightly dusky; veins of wings slightly smoky. Body length 1.30-1.40; across eyes .34; antenna 1.2-1.45; hind tibia .70-.80; rostral IV+V tip appearing needlelike in ventral aspect, attaining slightly beyond 2d coxa. Cornicle cylindrical, knobbed at tip, smooth. Hairs fingerlike on body, pointed on appendages. Cauda bluntly tapering, bearing 2-3 lateral pairs of hairs and one or two dorsal preapical ones.

Apterous Summer Vivipara. Medium brown; dusky on head, lateral areas on abdominal III, IV and V and solid bands on VII and VIII; frosted in appearance; antenna except II

and III, rostrum, entire legs and cornicle black; cauda and anal plate slightly dusky. Measurements same as alate vivipara except rostrum, which is attaining or surpassing 3rd coxa.

Ovipara. **Apterous. Same as apterous vivipara except as follows: Abdomen posterior to cornicles shining black; anal plate black; and proximal half of hind tibia swollen to twice the diameter of the narrowest part and bearing 20-30 rather large, flat sensoria.**

Male. **Alate. Color same as alate vivipara. Body length 1.30; hind tibia .85; hind tarsal II .13; antenna 1.80-1.90; cornicle .28; cauda .06 on median line, .09 on side.**

Egg. **Newly laid, shining straw-yellow, greenish at one end; later, brownish black.**

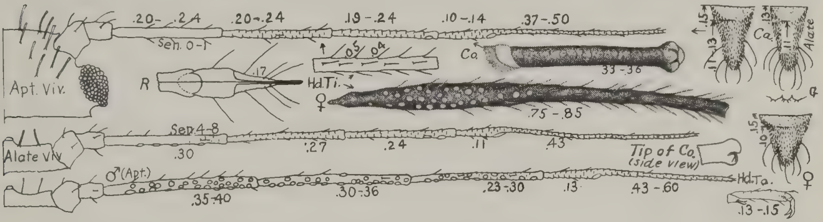

Fig. 232. *Epameibaphis atricornis*

Collections. On leaves and stems of *Artemisia longifolia* and *A. tridentata.* Colorado: De Beque,. Cross Mountain and Elk Springs. Utah: Throughout the state. Wyoming: Chimney Rock (near Jelm). Apterous summer viviparae Apr. 30 to Sept. 12, alate viviparae June 9 to Sept. 12, sexuales Oct. 21; rare.

Chief Distinguishing Characters. Brown body and black appendages and cornicle, absence of sensoria on antenna of aptera and few sensoria (not more than 4) on III of alate vivipara.

Genotype *Epameibaphis frigidae* (Oestlund)

Aphis frigidae **Oestlund, 1886:46 and 1887:65.**
Epameibaphis frigidae, **Gillette and Palmer, 1932b:470; Knowlton and Smith, 1936d: 90.**

Apterous Summer Vivipara. **Pale glaucous green, pulverulent and bearing numerous colorless capitate hairs which contribute to the frosted appearance; cauda and cornicle pale; appendages mostly pale, antennal VI and tip of V, tarsi and tips of tibiae black. Body length 1-1.30; hind tibia .60-.80; antenna 1.15-1.33; sensoria 1-4 on III; rostral IV+V, very slender and acute, tip needlelike in ventral aspect, attaining abdominal I.**

Alate Vivipara. **Head and thorax brown; abdomen pale glaucous green; frosty in appearance due to numerous colorless or white capitate hairs; antenna, except base of III, tarsi and tips of tibiae blackish; cornicle and cauda pale. Same in measurements as aptera except as follows: Antenna 1.30-1.50, secondary sensoria circular with very narrow rims. Vertex nearly flat with median tuberclelike process bearing the ocellus. Hairs distinctly capitate on body, conspicuous, .05-.07 long and numerous; faintly capitate on legs, .03-.05 long. Cornicle cylindrical, slightly curved, with flange knoblike. Cauda tapering, slightly longer than wide, bearing 3 lateral pairs of hairs, and one dorsal preapical one, often overlapped by abdominal VII and VIII. Lateral tubercles absent.**

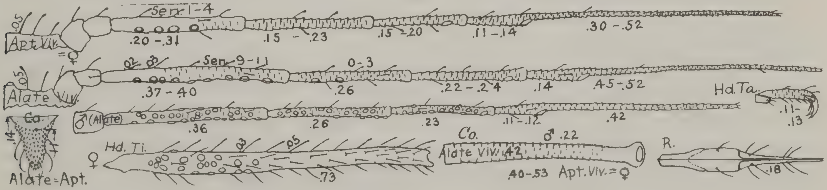

Fig. 233. *Epameibaphis frigidae*

Ovipara. **Apterous. Head dark brown, rest of body brownish to yellowish; antenna dark, cornicle somewhat dusky; swollen portion of hind tibia, tarsi and tips of tibiae black. Body length 1.44, pointed posteriorly; antenna 1.30; hind tibia with proximal third to half swollen and covered with large flat sensoria.**

Male. **Alate. Color similar to alate vivipara or brownish instead of green. Body length 1; hind tibia .66; antenna 1.50; bearing numerous sensoria on III, IV and V.**

Collections. On leaves and stems of *Artemisia frigida* and *tridentata*. Colorado: Pingree Park, Boulder, Fort Collins, La Porte, and Loveland. Throughout northern Utah. Wyoming: Lyman and Le Roy. Idaho: Shoshone Falls and Twin Falls. Apterous summer viviparae May 27 to Dec. 3, alate viviparae May 28 to July 2, sexuales Nov. 2 to 10; common.

Cotypes. Univ. of Minn. Collection.

Epameibaphis utahensis Knowlton and Smith

Epameibaphis utahensis **Knowlton and Smith, 1936d:91.**

Apterous Summer Vivipara. **Grayish green covered with numerous slightly capitate hairs which give whitish or grayish effect; antenna and cornicle dusky on distal portion; cauda and legs pale. Body length .90-1.20; across eyes .36-.40; antenna 1-1.1, occasionally one sensorium on III; hind tibia .53-.60; rostrum attaining 3d coxa. Cauda covered by abdominal VII and VIII*.**

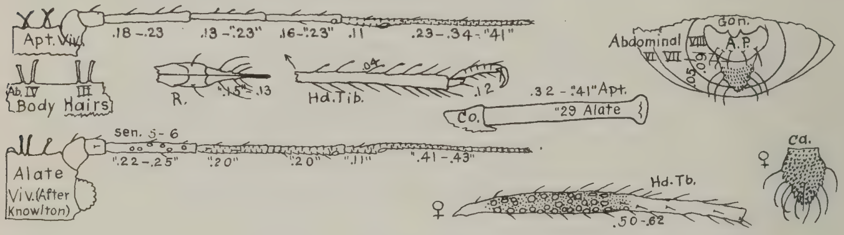

Fig. 234. *Epameibaphis utahensis*

Alate Vivipara. **Body length .92-1.20, across eyes .37; antenna 1.16-1.19; hind tibia .61-.64.**

Ovipara. **Apterous. Same as apterous vivipara except with proximal half of hind tibia swollen and dark and bearing scattered large sensoria.**

Collections. On leaves of *Artemisia filifolia, A. tridentata* and *A. vulgaris*. Utah: Throughout state. Wyoming: LeRoy and Lyman. Colorado: Buckingham. Apterous viviparae April 21 to June 9, alate viviparae June 9, oviparae Oct. 12; rather common.

Type. Knowlton Collection. Paratypes, U.S.N.M., Knowlton, C. F. Smith and Colo. Agri Exp. Sta. Collections.

Chief Distinguishing Characters. Pale cornicle and legs and absence of sensoria on III of the apterous vivipara.

Genus **Flabellomicrosiphum** Gillette and Palmer

Gillette and Palmer, 1932b:472.

Characters. Vertex slightly convex; frontal tubercles but slightly developed, not noticeably exceeding vertex. Secondary sensoria circular. Cornicle merely a raised pore. Cauda elongate, tapering or parallel-sided; anal plate rounded. Hairs broadly infundibulate rather than flabellate. Wing venation as in genus *Aphis*. Rostrum with V indistinct (IV and V coalesced). Ocular tubercle indistinct. Lateral tubercles not evident.

Genotype (monotypical), *Chaitophorus tridentatae* Wilson.

Key to Species of Flabellomicrosiphum

1. Unguis shorter than twice length of base of VI (p. 203)..*tridentatae*
.... Unguis 2-3 times length of base of VI (p. 203)..*knowltoni*

***In Wyoming at LeRoy and Lyman August 4 and at Zion Park, Utah, Sept. 7, specimens were taken which agree in all characters except that all measurements were much shorter. These may possibly be sexuparae since they were taken later in the summer than the above described specimens.**

Flabellomicrosiphum knowltoni Smith

Flabellomicrosiphum knowltoni **Smith (C.F.), 1937:128.**

Apterous Summer Vivipara. **Dull slaty to pinkish, overlaid with numerous pale infundibulate or funnel-shaped hairs which give a frosted appearance; dusky to black markings (still apparent in cleared and mounted specimens) as follows: Head, distal portion of base of antennal VI, and I, rostrum, coxae, trochanters, entire femora, especially 2d and 3d pairs, tarsi, cornicle, anal plate, ventral spot on abdominal VII and cauda; entire tibiae pale. Smith (op. cit.) says "hind tibia dusky in life; antenna pale excepting above mentioned portions." Body length 1.1-1.3; across eyes .34; antenna .83-1.05; hind tibia .53-.70; rostrum attaining to or slightly beyond 2d coxae. Hairs on vertex and body funnel-shaped or infundibulate, appearing flabellate on casual observation, .04-.05 long and numerous; on appendages simple; on III .01, reclinate and sparse; on hind tibia .03.**

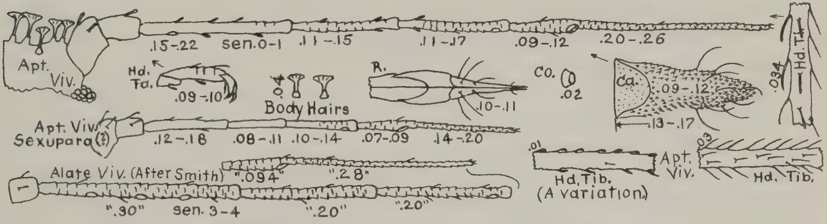

Fig. 235. *Flabellomicrosiphum knowltoni*

A collection taken July 30, comprising 7 adults and 2 nymphs with antenna slightly short, about .80, but agreeing in all other described characters with the above, showed strongly curved reclinate, spatulate hairs on all tibiae, in adults and even in the nymphs; though in the latter on the hind tibia some longer more erect simple hairs were scattered among the spatulate ones.

Most of the specimens taken in August, (sexuparae?) are smaller. Body length .95-1.1; antenna .62-.67 and hind tibia .38-.47. The tibial hairs were simple but finer than in first above-described viviparae.

Alate Vivipara. **Same as aptera or darker in color. Body length 1.4; antenna 1.19; hind tibia .77; hind tarsal II .11; rostrum as in aptera.**

Collection. On *Artemisia tridentata.* Utah: Source of Logan City drinking water system (in Logan Canyon), Salt Lake City, Cedar Valley, mouth of Mueller's Park, Spring City, Brigham, Bountiful and Roy. Apterous viviparae April 25 to Aug. 23, alate viviparae July 30 to Aug. 23; rare.

Type. U.S.N.M. Paratypes, Knowlton, C. F. Smith and Colo. Agr. Exp. Sta. Collections.

Chief Distinguishing Characters. Slaty color of body, color of coxae, trochanters and femora (dusky to black), length of unguis (longer than twice base of VI).

Genotype *Flabellomicrosiphum tridentatae* (Wilson)

Chaitophorus tridentatae **Wilson, 1915a:89.**
Flabellomicrosiphum tridentatae, **Gillette and Palmer, 1932b:472; Smith (C.F.), 1937:127.**

Apterous Summer Vivipara. **Pale green; covered with white funnel-shaped hairs, giving frosted appearance; antenna pale proximally, dusky distally; cauda greenish or slightly dusky; legs pale; tarsi black. Body length 1-1.4; hind tibia .45-.55; antenna "47"-.65-.80; rostrum acute, IV+V tapering, laterally compressed, tip beyond hairs needlelike in ventral aspect, surpassing 2d ,coxa.**

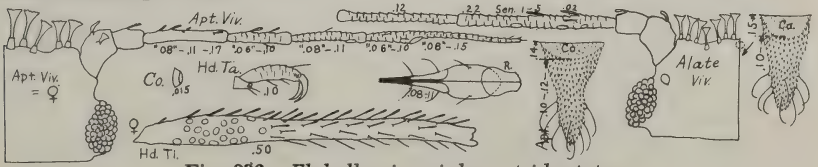

Fig. 236. *Flabellomicrosiphum tridentatae*

Alate Vivipara. Same in color and measurements as aptera. Secondary sensoria flat. Hairs on body broadly funnel-shaped with slender shaft and on slightly broadened base or pedicle, numerous and erect, .05 long; on antenna but slightly capitate, drooping and sparse; on hind tibia, blunt to pointed, drooping and .02-.03 long, longer than diameter of tibia and fairly numerous. Cornicle truncate or slightly mammiform, without flange, not imbricated, hardly more than a raised pore. Cauda tapering to parallel-sided, elongate, rather acute, bearing 3-4 hairs on each side and 2-3 dorsal ones near tip.

Ovipara. Apterous. (Mounted in balsam), color and measurements same as in apterous vivipara, except as follows: Body more pointed posteriorly and hind tibia with proximal third to nearly half distinctly swollen, blackish, and bearing about 14 flat sensoria.

Collections.* On leaves and flower stems of *Artemisia tridentata.* Colorado: Paonia. Utah: Throughout state. Idaho: Twin Falls. Apterous summer viviparae Aug. 24, oviparae Nov. 4; apparently rare.

Genus **Hyalopterus** Koch

Koch, 1854:16; Baker, 1920a:47.

Characters. Vertex distinctly convex; frontal tubercles developed equal with vertex. Antenna six-segmented; secondary sensoria circular, convex. Hairs conspicuous, pointed. Cauda parallel-sided to elongate-tapering to spoon-shaped. Cornicle cylindrical to slightly clavate, without flange, with opening at tip not oblique. Fore wing venation as in *Aphis.* Lateral tubercles present. Genotype (fixed by Passerini, 1860), *Aphis pruni Fabricius* (syn. of *A. arundinis* Fabricius).

Key to Species of Hyalopterus

1. Rostral IV+V broad, .08 long, about half length of hind tarsal II; sensoria present on IV of alata (p. 204)........*arundinis*

.... Rostral IV+V not broad, .12 long, almost equalling length of hind tarsal II; sensoria absent on IV of alata (p. 205)........*atriplicis*

Genotype *Hyalopterus arundinis* (Fabricius)

The Mealy Plum Aphid

Aphis arundinis Fabricius, 1775:734.
Aphis pruni Fabricius, 1775:735.
Hyalopterus arundinis, Davidson (W. M.), 1919a:1; Theobald, 1927:19; Gillette and Palmer, 1932b:473.

Fundatrix. Same as summer apterous vivipara except the following: Body length 2.10-2.35, width 1.30; hind tibia .60-.70; hind tarsal II .12; antenna .70-.80, III+IV (coalesced) .23-.34, V .13-.17, VI .09+.13; cornicle .03.

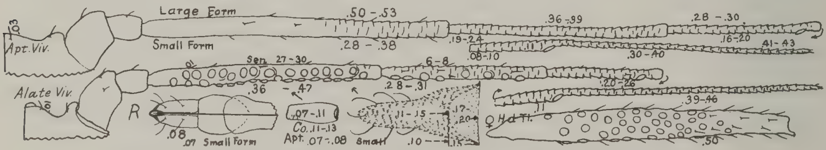

Fig. 237. *Hyalopterus arundinis*

Apterous Summer Vivipara. Yellow-green with powdery areas dorsolaterally, leaving 3 longitudinal greener lines; cornicle, cauda, and appendages pale; tarsi, tips of appendages dusky. *Large Form.* Body length 1.80-2.10; hind tibia 1.1; hind tarsal II .17; antenna 1.95-2; rostral IV+V broad, width at base exceeding half of length, attaining 2d coxa. Hairs .03 long on hind tibia. *Small Form.* Body length 1.30-1.50; antenna 1.30-1.50; hind tibia .65-.85; hind tarsal II .13-.14; cauda .10 on median line, .15 on side.

Alate Vivipara. Head and thorax brown; abdomen yellow-green to apple-green; powdery; appendages and cornicle slightly dusky; cauda and anal plate pale to slightly dusky. Body length 1.5-1.9; hind tibia 1; hind tarsal II, .15; antenna 1.4-1.8, secondary sensoria convex to slightly tuberculate. Hairs pointed, sparse; .02 on hind tibia. Cornicle cylindrical to slightly clavate, weak, without flange, not imbricated. Cauda parallel-sided to elongate-tapering with rather abruptly broadened base, suggesting slight neck, bearing 2-3 pairs of lateral hairs and a single preapical one. Lateral tubercles present on prothorax and all abdominal segments.

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*Alate viviparae used in description were presented to our collection by H. F. Wilson, collected at Hermiston, Oregon May 2, 1914. Oviparae were presented by Ralph H. Smith from Idaho.

Ovipara. Apterous. Head yellow; body pale greenish yellow with median green stripe and traces of dorsolateral stripes; with tufts of waxy threads on ventrolateral portions of abdominal III to VII inclusive; antenna pale to IV, dusky on IV through VI; cauda pale; cornicle pale with dusky tip; legs pale with tarsi, tips of 1st and 2d and entire 3d tibia blackish. Body length 1.30; antenna .90, III .18, IV .10 or III+IV (coalesced) .27, V .13, VI .08+.21-.25; hind tarsal II .12; hind tibia distinctly swollen along almost entire length and bearing numerous rather large, nearly flat sensoria.

Male. Alate. Head and thorax brown; abdomen greenish yellow with median dark line and crossbands on abdominal VII and VIII; covered with slight powder; cornicle, cauda and appendages dark brown to blackish. Body length 1; antenna 1.50, III .40, IV .30, V .26, VI .10+.43, secondary sensoria, slightly tuberculate and numerous on III, IV and V; cornicle .06; cauda .08.

Collections. On leaves of plum *(Prunus domestica)* and apricot *(Prunus armeniaca)* as winter host and in part as summer host and grass *(Phragmites communis)* as summer host. Throughout region. Fundatrices in May on *Prunus,* apterous and alate viviparae from May to Nov. on both *Prunus* and grass, sexuales Oct. 1 to Nov. 14 on *Prunus;* very common and injurious.

The name *Hyalopterus pruni* (Geoffroy) (1762) cannot replace *H. arundinis* (Fabricius) because Geoffroy only stated "*Aphis pruni* Reaumur, 1737 ins. 3:296," and failed to add even one descriptive word; therefore the name is nomen nudum. The name *pruni* must date from Fabricius 1775, but *arundinis* has page precedence.

Hyalopterus atriplicis (Linnaeus)

The Boat Gall Aphid

Aphis atriplicis Linnaeus, 1761:262; Theobald, 1913a:1.
Aphis chenopodii Cowen (in Gillette and Baker), 1895:119.
Hyalopterus atriplicis, Hayhurst, 1909:88; Theobald, 1927:26; Gillette and Palmer, 1932b:474.

Apterous Summer Vivipara. Head brown; rest of body yellowish green, mottled with darker green on abdomen; powdery; cauda and cornicle pale to dusky especially at tip; appendages pale brownish, darker at tips. Body length 1.60; hind tibia .70-.75; hind tarsal II .14; antenna 1; rostrum attaining 2d coxa.

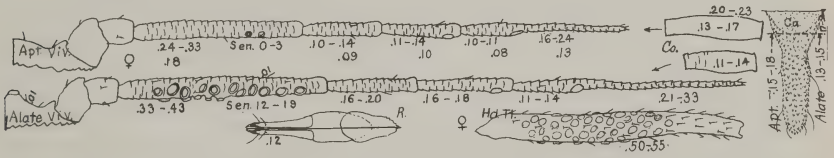

Fig. 238. *Hyalopterus atriplicis*

Alate Vivipara. Head and thorax black; abdomen pea-green, with darker green lateral areas and dorsal crossbands; powdery; appendages dusky brown with tarsi and tips of tibiae blackish; cornicle, cauda and anal plate slightly dusky. Body length 1.50; hind tibia .93; hind tarsal II .15; antenna 1.1-1.2; rostrum attaining halfway between 1st and 2d coxae. Hairs pointed, sparse; .01 long on hind tibia. Cornicle slightly incrassate, with flange and smooth, same width as hind tibia. Cauda elongate-spoon-shaped with two pairs of lateral and one pair of terminal hairs. Lateral tubercles present on prothorax and all abdominal segments.

Ovipara. Apterous. Pale yellowish green; powdery. Body length 1.80; antenna .70-.86; hind tibia distinctly swollen for almost entire length and covered with rather large subcircular sensoria.

Egg. Newly laid, pale yellowish; shining; turning black later. Size .63 by .30.

Collections. In longitudinally folded leaves of *Chenopodium album.* Throughout region. Fundatrices May 8 to 24, apterous summer viviparae May 18 to Aug. 18, alate viviparae May 25 to July 19, oviparae Sept. 30 to Oct. 20; very common.

Genus **Microsiphum** Cholodkovsky

Cholodkovsky 1908:687; Baker, 1920a:49.

Characters. Frontal tubercles moderately developed but not markedly exceeding vertex. Secondary sensoria circular. Cornicle not longer than broad at base, truncate or short-cylindrical or narrowed at the base. Cauda broader than long, tapering, bearing numerous hairs. Fore wing with media twice-forked. Hairs simple.

Genotype (monotypical), *Microsiphum ptarmicae* Cholodkovsky.

Key to Species of Microsiphum

1.	Cauda bearing about 6 pairs of lateral hairs (p. 208)	*ptarmicae*
....	Cauda bearing distinctly fewer than 6 pairs of hairs	2
2.	Body bearing blunt to fan-shaped hairs (p. 207)	*oregonensis*
....	Body not bearing fan-shaped hairs	3
3.	Unguis 5-6 times length of base of VI (p. 207)	*artemisiae*
....	Unguis shorter than five times length of base of VI (p. 206)	*acophorum*

Microsiphum acophorum Smith and Knowlton

Microsiphum acophorum Smith and Knowlton, 1938:162.

Apterous Summer Vivipara. "Shiny brownish black to black on dorsum," which also appears dark in cleared and mounted specimens, which latter show venter colorless except dark patch on abdominal VIII, dark color on coxae, trochanters, femora, especially 2d and 3d pairs, tips of tibiae, entire tarsi, antennal I and II, tip of IV, more or less of V and entire VI and rostrum; cauda, anal plate, genital plate and cornicle pale to slightly dusky. Body length 1.03-1.45; across eyes .34-.35; antenna 1.10-1.63; hind tibia .50-.85; hind tarsal II .10-.125-".14"; rostrum attaining 3d coxa or abdomen.

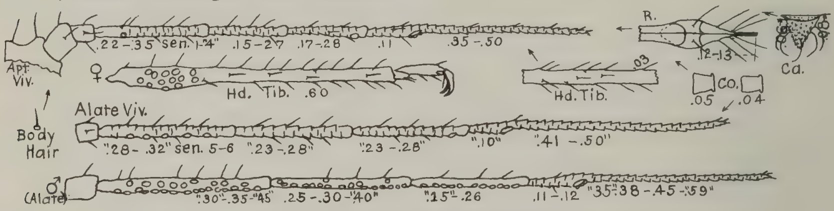

Fig. 239. *Microsiphum acophorum*

Alate Vivipara. Black; antenna dark. Body length 1.25-1.43; antenna 1.38-1.50; hind tibia .78-.84; hind tarsal II .14; rostrum attaining abdomen. Cornicle cylindrical or slightly broader at base, smooth and with flange. Cauda tapering, acute, shorter than broad, bearing 2 pairs of lateral hairs.

Ovipara. Apterous. "Shiny brownish black." (Cleared and mounted on slide), dark markings as follows: Head, dorsal bands on abdominal VII, dorsal and ventral bands on VIII, lateral spots on abdominal I to VIII; coxae, trochanters and femora especially 3d pair, knees, swollen portion of hind tibia, tips of tibiae, entire tarsi, entire antenna though paler on III, cauda, cornicle and rostrum, especially distally. Body length 1.3-1.4; across eyes .34; antenna 1.1-1.6; segments as in apterous vivipara; hind tibia .55-.63 long, proximal third distinctly swollen and bearing about 12 large sensoria.

Male. Alate. Greenish brown; antenna blackish; legs and rostrum dusky; cornicle pale to dusky. Body length 1.10; across eyes .34; antenna 1.5-1.6; hind tibia .65-.75; hind tarsal II .11-.12; rostrum attaining abdomen.

Collections. On *Artemisia tridentata* and *A. longifolia*. Colorado: Craig. Utah: Throughout northern part of the state. Wyoming: Chimney Rock (near Jelm). Idaho: Whitney and Thousand Springs. Apterous viviparae May 19 to Sept. 3, alate viviparae July 7, sexuales Sept. 11 to Oct. 9, eggs Oct. 7; somewhat common.

Type. U.S.N.M. Paratypes, C. F. Smith, Knowlton and Colo. Agr. Exp. Sta. Collections.

Chief Distinguishing Characters. Pointed hairs on vertex and length of unguis (shorter than five times base of VI).

Microsiphum artemisiae (Gillette)

Chaitophorus artemisiae Gillette, 1911a:440.
Microsiphum artemisiae, Gillette and Palmer, 1932b:475; Smith and Knowlton, 1938: 164.

Apterous Summer Vivipara. Young. Greenish. *Adult.* Dark blackish brown to cinnamon-brown; shining; antenna beyond middle of III, cornicle and cauda dusky; most of tibiae pale, tips brown to black. Body length 1.6-2; hind tibia .90; hind tarsal II .15; antenna 1.40-1.95; cauda slightly broader at base than entire length; rostrum acute, tip beyond hairs acute but hardly needlelike, attaining between 2d and 3d coxae.

Alate Vivipara. Head and thorax blackish brown; abdomen cinnamon-brown; antenna, cornicle and cauda dark; legs pale. Body length 1.4-1.5; hind tibia .82-1; all other parts as in apterous vivipara except rostrum hardly surpassing 2d coxa. Hairs blunt or slightly capitate, rather heavy; .02-.03 on hind tibia. Cornicle short, cylindrical or truncate, with flange and faintly wrinkled transversely or smooth. Cauda broadly triangular with tip narrowly tapering, bearing two pairs of lateral hairs and a single preapical one. Lateral tubercles shallow and broad.

Ovipara. Apterous. Olive-brown; otherwise similar to apterous vivipara but body more pointed and elongate posteriorly and with hind tibia pale except tip and slightly swollen on proximal third and bearing small circular to oval, scattered sensoria.

Male. Apterous. Greenish brown. Body length 1.30; hind tibia .56. Otherwise as in apterous vivipara except sensoria numerous on III, IV and V.

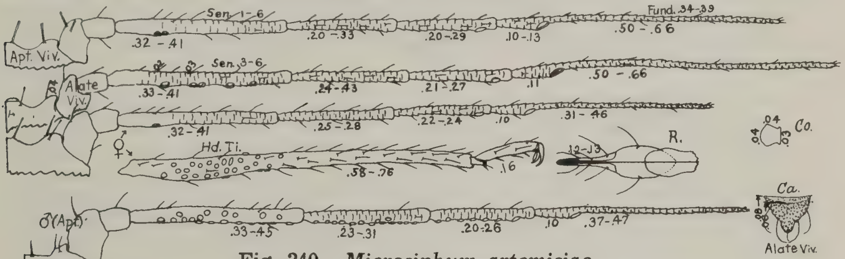

Fig. 240. *Microsiphum artemisiae*

Collections. On leaves and stems of *Artemisia aromatica* (formerly *dracunculoides*), *A. vulgaris* and *A. ludoviciana.* Colorado: Generally on the eastern slope of the Rockies and on *A. tridentata* at Craig, Gunnison, Delta and Antonito. Utah: Generally in northern part of the state. Southern Idaho. Apterous summer viviparae May 18 to Sept. 22, alate viviparae May 18 to July 14, sexuales Sept. 25 to Oct. 8; not common but when occurring, very abundant on individual plants.

Type. U.S.N.M., No. 41937. Paratypes, Colo. Agr. Exp. Sta. Collection.

This species is closely allied to *Cryptosiphum canadensis* Williams but differs as follows: Color of body which, according to Williams' description, is green in the adult and rostral IV+V which, in cotypes, is .15 long and with needlelike tip. Furthermore, Gillette's specimens were not curling leaves as Williams' species is described as doing.

This species does not agree entirely with the genus *Microsiphum.* It seems to differ somewhat in shape of cornicle and cauda.

Microsiphum oregonensis Wilson

Microsiphum oregonensis Wilson, 1915:91; Smith and Knowlton, 1938:165.

Apterous Vivipara. "Shining chocolate"; antenna beyond middle of V, anal plate, genital plate, tarsi, tips of tibiae and of rostrum dark; cornicle somewhat dusky; tibiae and cauda pale to slightly dusky. Body length 1.20-1.35; across eyes .33-.35; antenna 1.10; hind tibia .60-.70; rostrum attaining about to 3d coxa. Cornicle cylindrical to slightly truncate, with slight flange. Cauda tapering, with 2 pairs of rather long lateral hairs and a single preapical one. Hairs slightly fan-shaped or infundibulate to blunt on vertex and body and a few on antennal III, pointed on rest of antenna and on legs.

Ovipara. Apterous. (Mounted in balsam), all appendages and cauda and anal and genital plates dusky; otherwise same as apterous vivipara except hind tibia, the proximal third of which is distinctly swollen and bearing scattered sensoria.

Male. Alate. (Mounted in balsam), all appendages dark to black. Body length 1; across eyes .33-.36; antenna 1.70, III, IV and V bearing numerous sensoria; hind tibia .60-.85; otherwise as in aptera.

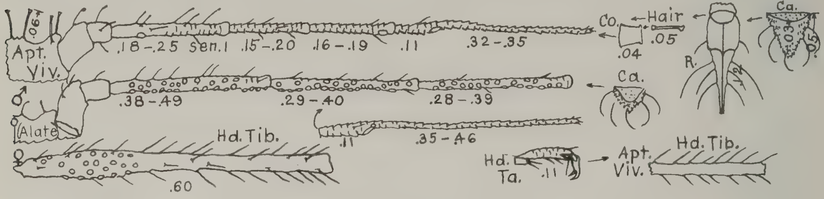

Fig. 241. *Microsiphum oregonensis*

Collections. On leaves and stems of *Artemisia tridentata.* Utah: Throughout state. Colorado: Gunnison. Idaho: Castle Ford and Riverdale. Apterous viviparae June 26 to Oct. 10, sexuales Oct. 11; rather rare.

Chief Distinguishing Characters. Infundibulate hairs on vertex and body, rather short length of antenna especially unguis and length of rostral IV+V (shorter than .14).

[Genotype *Microsiphum ptarmicae* Cholodkovsky]

Microsiphum ptarmicae Cholodkovsky, 1908:687.

Apterous Summer Vivipara. (Mounted in balsam), somewhat dusky; head, prothorax, cornicle, cauda, anal plate, rostrum, and appendages dark. Body length 2-2.2; across eyes .44-.48; across in front of eyes .35-.39; antenna 2.20-2.45; hind tibia 1.25-1.35; rostrum attaining 3d coxa. Cornicle cylindrical or narrower at base than at tip, without flange; cauda tapering and bearing about 6 hairs on each side; anal plate with median protuberance.

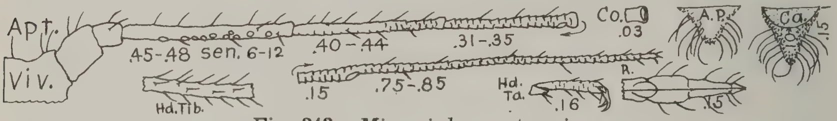

Fig. 242. *Microsiphum ptarmicae*

Host. Achillea ptarmica. (Not taken in region.)

Type. Zool. Inst., Leningrade. Metatypes, Colo. Agr. Exp. Sta. Collection. Above description and drawings made from 4 metatype specimens.

Genus **Pseudoepameibaphis** Gillette and Palmer

Gillette and Palmer, 1932a:145 and 1932b:477.

Characters. Vertex nearly flat; frontal tubercles absent. Ocular tubercle rudimentary. Secondary sensoria circular. Hairs blunt to funnel- or fan-shaped. Cornicle slender, slightly swollen distally on inner side, impinged against abdomen, and with thin-edged flange set obliquely. Cauda tapering. Lateral tubercles not evident. Wing venation as in genus *Aphis.* This genus differs from *Epameibaphis* Oestlund only in the shape of the cornicle.

Genotype (monotypical), *Pseudoepameibaphis glauca* Gillette and Palmer.

Key to Species of Pseudoepameibaphis

1. Unguis twice as long as cornicle (p. 209)........*glauca*
.... Unguis shorter than twice as long as cornicle........2
2. Cornicle not longer than .17, not longer than twice hind tarsal II (p. 209)........*essigi*
.... Cornicle longer than .17, 2-4 times as long as hind tarsal II........3
3. Unguis at least .75 times length of cornicle (p. 210)........*tridentatae*
.... Unguis shorter than .75 times length of cornicle........4

4. Cornicle shorter than 3.5 times length of rostral IV+V; cauda considerably covered by abdominal VIII (p. 210) .... *xenotrichis*

.... Cornicle longer than 3.5 times length of rostral IV+V; cauda not covered by abdominal VIII (p. 211) .... *zavilla*

Pseudoepameibaphis essigi Knowlton and Smith

Pseudoepameibaphis essigi **Knowlton and Smith, 1938d:218.**

Apterous Summer Vivipara. Whitish yellow to orange-green, covered with numerous blunt to narrow fan-shaped or flattened funnel-shaped hairs; without dusky markings; appendages pale except tips of antenna and tarsi which are dusky. Body length .65-1; across eyes .27-.31; hind tibia .30-.37; antenna .42-.63; rostrum attaining barely to 3d coxa. Cauda tapering, rounded bearing 2 pairs of lateral hairs and a single preapical one.

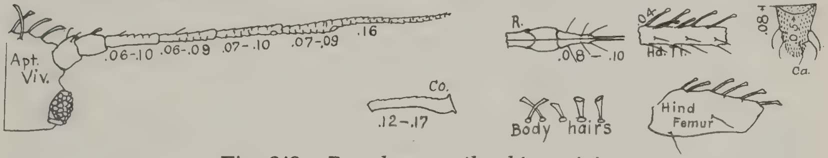

Fig. 243. *Pseudoepameibaphis essigi*

Collections. On *Artemisia,* usually *tridentata.* Colorado: Palisade. Utah: Throughout state. Apterous viviparae June 17 to Sept. 24; not rare.

Type. U.S.N.M. Paratypes, Knowlton, C. F. Smith and Colo. Agr. Exp. Sta. Collections.

Chief Distinguishing Characters. Small size and especially short antennal III (much shorter than cornicle and hardly half the length of the unguis), short rostral IV+V (.08-.10) and rather heavy, blunt to funnel-shaped hairs.

Genotype *Pseudoepameibaphis glauca* Gillette and Palmer

Pseudoepameibaphis glauca **Gillette and Palmer, 1932a:145 and 1932b:477.**

Alate Vivipara. Head and thorax brown; abdomen glaucous green; slightly powdery throughout; cauda pale; cornicle pale with dusky tip; appendages mostly pale, wing veins brown, rather heavy. Body length 1.2-1.5; hind tibia .70-.75; hind tarsal II .12; antenna 1.4, secondary sensoria flat. Cauda tapering, acute, bearing 2 pairs of lateral hairs and one preapical one; rostrum with portion beyond hairs needlelike in ventral aspect, attaining 2d coxa. Cornicle as in apterous vivipara.

Apterous Summer Vivipara. Glaucous green; powdery; appendages as in alate vivipara. Body length 1-1.60; hind tibia .55-.70; antenna 1-1.1; rostrum attaining 3d coxa. Hairs slender, slightly capitate; on body .05-.06 and conspicuous; on antenna very sparse, and inconspicuous; on hind tibia .05. Cornicle slender, not as wide as hind tibia, slightly swollen on inner side of distal third, flange distinct and thin-rimmed, oblique. Cauda tapering bearing two pairs of lateral hairs and a single dorsal preapical one. Lateral and ocular tubercles not evident. Tibiae with terminal pad not evident.

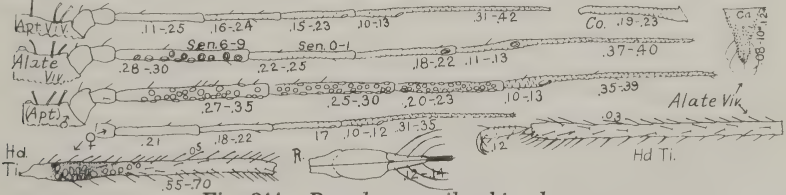

Fig. 244. *Pseudoepameibaphis glauca*

Ovipara. Apterous. Dusky olive-brown tinged with yellow where eggs show through body wall; powdery; appendages sordid yellow, with tarsi and tips of tibiae also swollen portion of hind tibia black; cornicle pale brownish with black tip. Measurements same as in apterous vivipara. Hind tibia somewhat swollen on proximal third and bearing about 12 flat sensoria.

Male. Apterous, but with vertex bearing median ocellus as in alate vivipara. Dark olive-brown to greenish, powdery; antenna blackish; otherwise same as ovipara. Body length .80; hind tibia .72; antenna 1.50; cornicle .15.

Egg. Newly laid, pale lemon-yellow; later, black. Size .59 by .26.

Collections. On leaves and stems of *Artemisia frigida.* Throughout region. Apterous summer viviparae March 20 to Oct. 12, alate viviparae April 15 to June 2, oviparae Oct. 30 to Dec. 3, males Nov. 6 to Dec. 3; rather common but difficult to detect on account of protective coloration and agility in escaping.

Type. U.S.N.M., No. 43846. Paratypes, Colo. Agr. Exp. Sta. Collection.

This species very closely resembles *P. tridentatae* but differs from Wilson's description in longer antenna and cauda and slender hairs. This species is found mingled with *Epameibaphis frigidae* but is easily separated by different shape of cornicle.

Pseudoepameibaphis tridentatae (Wilson)

Pseudoepameibaphis glauca Gillette and Palmer (misidentification), Knowlton and Smith, 1938d:220.
Aphis tridentatae Wilson, 1915a:94.
Pseudoepameibaphis tridentatae, Palmer, 1936b:740; Knowlton and Smith, 1938:217.

Apterous Summer Vivipara. Pale yellowish with frosty appearance due to colorless, somewhat funnel-shaped hairs; all appendages pale except tarsi, tips of tibiae and of antenna which are dusky. Body length 1.30-1.45; antenna about .90; rostrum attaining between 2d and 3d coxae. Cauda tapering and bearing 2 pairs of lateral hairs and a single preapical one. Cornicle somewhat curved outward, clavate and with flange set obliquely, held close against body. Hairs stout, cylindrical to somewhat funnel-shaped, on body .04-.06, blunt to slightly capitate on hind tibia; blunt, minute and sparse on antenna.

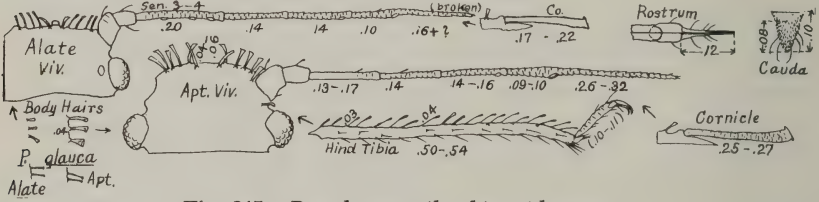

Fig. 245. *Pseudoepameibaphis tridentatae*

Alate Vivipara. Color similar to apterous vivipara. Body length 1; hind tibia .60; antenna about .90; otherwise as in aptera except that hairs are slightly shorter.

Collections. On leaves and stems of *Artemisia tridentata.* Colorado: Eaton Reservoir (near Sand Creek Pass in northern Larimer County) and Cameron Pass (near Gould). Utah: Throughout northern part of state. Apterous viviparae Aug. 8 to 21; rare. (Alate viviparae not taken in region, described and figured from metatypes from Oregon.)

Type. Granovsky Collection.

Chief Distinguishing Characters. Character of the hairs on body (rather stout and funnel-shaped), short antenna (III and unguis shorter than cornicle in aptera, hardly longer in alata), number of sensoria (3-4) on III of alate vivipara and rather short hind tibia (.5-.54 in apterous, .60 in alate vivipara).

Pseudoepameibaphis xenotrichis Knowlton and Smith

Pseudoepameibaphis xenotrichis Knowlton and Smith, 1938d:221.

Apterous Summer Vivipara. "Greenish, overcast with whitish due to numerous fan-shaped or funnel-shaped hairs." (Cleared and mounted), immaculate; even appendages entirely pale, except tarsal claws. Body length .90-1.05-"1.2"; across eyes .29-.33; antenna .50-.60; hind tibia .33-.40; rostrum attaining between 2d and 3d coxae. Cornicle and cauda typical, the latter usually hidden under abdominal VIII.

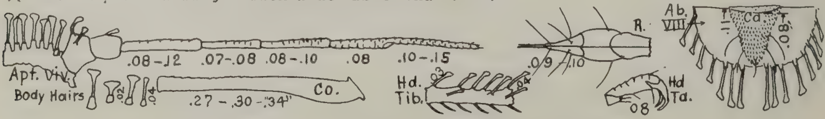

Fig. 246. *Pseudoepameibaphis xenotrichis*

Collections. On *Artemisia tridentata.* Utah: Brigham Canyon, Perry and Sardine Canyons. Apterous viviparae July 8; rare.

Type. U.S.N.M. Paratypes, Knowlton and C. F. Smith Collections.

Chief Distinguishing Characters. Abdominal VIII which is superimposed over the cauda, abundant broadly-funnel-shaped hairs on the body and heavy capitate ones on the tibiae, relatively short unguis (shorter than twice length of base of VI and hardly longer than third of length of tibia).

Pseudoepameibaphis zavilla Knowlton and Smith

Pseudoepameibaphis zavilla Knowlton and Smith, 1938d:221.

Apterous Summer Vivipara. "Greenish; pulverulent"; without dusky markings; appendages pale except tips of tarsi and distal tips of antennal V and base of VI. Body length 1.5-1.75; across eyes .40-.47; antenna .75-.85; hind tibia .50-.55; rostrum attaining between 2d and 3d coxae. Cornicle and cauda typical.

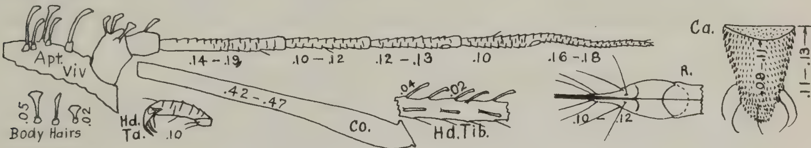

Fig. 247. *Pseudoepameibaphis zavilla*

Collections. On *Artemisia tridentata.* Wyoming: Jackson Hole. Apterous viviparae June 12; rare.

Type. Knowlton Collection.

This species possesses longer cornicles than the other species of this genus here treated (over 2.5 times III and same proportion to unguis and 4-4.5 times base of VI).

Genus **Rhopalosiphum** Koch

Koch, 1854:23.

Characters. Frontal tubercles hardly developed beyond vertex. Secondary sensoria circular, with narrow rims. Cornicle swollen, clavate, longer than entire length of cauda. Cauda parallel-sided or tapering. Hairs pointed or blunt. Wing venation as in genus *Aphis.* Living exposed on leaves and twigs of plants. Genotype (fixed by Gerstaecker, 1856), *Aphis nymphaeae* Linnaeus.

Key to Species of Rhopalosiphum

1. Cornicle twice as wide in distal half as at base 2
.... Cornicle indistinctly swollen to nearly cylindrical.......... 10
2. Cornicle more than twice as wide in distal half as at base (p. 212).......... *berberidis*
.... Cornicle not swollen to twice as wide in distal half.......... 3
3. Cornicle symmetrically swollen (p. 223) .... *serotinae*
.... Cornicle more swollen on median side.......... 4
4. Rostrum acute, with short needlelike tip (p. 221).......... *rufomaculatum*
.... Rostrum obtuse.......... 5
5. III longer than .65 in alata, longer than .40 in aptera.......... 6
.... III shorter than .65 in alata, shorter than .40 in aptera.......... 7
6. On *Lonicera* (p. 217) .... *grabhami*
.... On *Poa* (p. 219) .... *poae*
7. Sensoria not more than 12 on III of alata; cornicle longer than three times rostral IV+V (p. 220) .... *rhois*
.... Sensoria more than 12 on III of alata; cornicle not longer than three times rostral IV+V 8
8. Rostral IV+V .15, coequal with hind tarsal II (p. 218).......... *nymphaeae*
.... Rostral IV+V .10, shorter than hind tarsal II.......... 9
9. III 1.5-2 times length of IV; sensoria fewer than 30 on III in alata (p. 220) .... *pseudobrassicae*
.... III 2-3 times length of IV; sensoria more than 30 on III in alata (p. 213) .... *conii*

10. Cauda bearing 4 pairs of hairs; sensoria 2 on III of aptera; media of fore wing with 2d branch normal (p. 213)........ *bossekiae*
.... Cauda bearing fewer than 4 pairs of hairs; sensoria absent on III of aptera; media of fore wing with 2d branch short........ 11
11. Unguis 1.5-2 times base of VI (p. 217)........ *maidis*
.... Unguis longer than twice base of VI........ 12
12. Unguis 3-4 times base of VI (p. 222)........ *scirpifolii*
.... Unguis 4-5 times base of VI........ 14
.... Unguis 5-6 times base of VI........ 13
13. Length of hairs on III in aptera not exceeding diameter of III; body reddish brown; body length 2 or more (p. 214)........ *enigmae*
.... Length of hairs on III in aptera exceeding diameter of III; body green with red areas about cornicle bases; body length smaller than 2 (p. 223)........ *splendens*
.... Same as above except body brown or grayish green and without red coloration (p. 224)........ *subterraneum*
14. Fore wing with media always twice-forked (p. 215)........ *fitchii*
.... Fore wing with media twice-forked or frequently once-forked (p. 219)........ *padi*

Rhopalosiphum berberidis (Kaltenbach)

The Barberry Aphid

Aphis berberidis Kaltenbach, 1943:95.
Rhopalosiphum berberidis Gillette and Palmer, 1932b:480.

Overwintering Vivipara. Apterous. Green, splotched with red especially laterally and posteriorly; antenna, cornicle, cauda and legs pale. Body length 2.10; antenna .84; hind tibia .70.

Apterous Summer Vivipara. Yellow tinged with greenish especially on dorsolateral areas; antenna, cornicle, cauda and legs pale with tarsi and tips of tibiae dusky. Body length 1.50-1.70; hind tibia .55-.82; hind tarsal II .12; antenna .75-1. Hairs slightly capitate to blunt; rostrum obtuse, attaining or slightly surpassing 2d coxa. Dorsal body surface rugose.

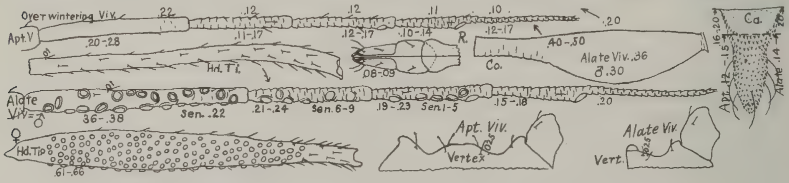

Fig. 248. *Rhopalosiphum berberidis*

Alate Vivipara. Head and thoracic lobes yellowish brown; pronotum and abdomen yellow, the latter with dorsolateral row of green spots; cauda yellow; antenna slightly dusky; legs yellowish with tarsi black and tips of tibiae brown to black; cornicle pale yellow with tip dusky. Body length 1.7-1.9; hind tibia .82; hind tarsal II .12; antenna 1.25-1.50, rostrum attaining between 1st and 2d coxae. Hairs pointed; .01 on hind tibia. Cornicle smooth, club-shaped, .04 wide at base .09 in distal half, constricted at tip, with flange. Cauda long, tapering with 3 pairs of lateral hairs.

Ovipara. Apterous. Pale to deep salmon with a pair of dorsolateral rows of greenish to rusty brown blotches extending from pronotum and united into a solid patch on abdominal V or VI, VII and VIII, also a lateral row on each side of abdomen anterior to cornicle; antenna, 1st and 2d tibiae and cornicle pale yellow with black tip; hind tibia dusky throughout; cauda pale yellowish. Body length 1.50-1.80; antenna .95. Hind tibia distinctly swollen and thickly covered with small convex sensoria.

Male. Alate. Head and thorax dusky brown with pair of oblique green dashes on pronotum; abdomen pale yellow with 6 greenish to dusky spots or bands; antenna dusky brown; cornicle pale yellowish to brownish. Body length 1.40; hind tibia .80; antenna 1.45; segments and sensoria as in alate vivipara; cornicle .30.

Collections. On leaves or bark of twigs of *Berberis vulgaris*. Colorado: Fort Collins and Greeley. Fundatrices and hibernating apterous viviparae March 25 to April 8, apterous summer viviparae April 27 to Nov. 14, alate viviparae May 19 to Dec. 2, sexuales Oct. 2 to Nov. 29; common.

Rhopalosiphum bossekiae Gillette and Palmer

The False Raspberry Aphid (Plate IV, 9-10)

Rhopalosiphum bossekiae Gillette and Palmer, 1929b:474 and 1932b:481.

Apterous Summer Vivipara. Light greenish yellow to pale green, streaked or mottled with darker green on median line on abdominal IV, V and VI; dorsum shagreened; antenna pale to base of IV then dusky; cornicle and cauda pale to dusky; legs pale except tarsi and tips of tibiae which are blackish. Body length 1.80; hind tibia .60-1.10; antenna .90-1.30; rostrum obtuse, IV+V slender, attaining between 2d and 3d coxae.

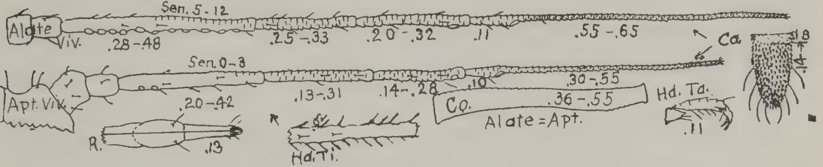

Fig. 249. *Rhopalosiphum bossekiae*

Alate Vivipara. Head and meso- and metathorax yellow-brown; pronotum and abdomen pale green; antenna pale dusky; legs pale brownish yellow except tarsi and tips of tibiae which are blackish; cornicle and cauda pale yellow. Same in measurements as aptera to slightly longer. Hairs blunt to capitate; on body .02 long and fairly numerous; cornicle somewhat swollen on inner side of distal third, slightly curved at base, transversely rugose on proximal third, with slight flange. Cauda parallel-sided or slightly tapering obtuse, bearing 3-4 hairs on a side. Lateral tubercles inconspicuous, present on abdominal II, III and IV.

Collections. On leaves and stems of *Rubus deliciosus.* Colorado: Foothills of the eastern slope of the Rockies in northern part of state. Apterous summer viviparae June 13 to Aug. 30, alate viviparae June 30 and July 1; rare.

Type. U.S.N.M., No. 41923. Paratypes, Colo. Exp. Sta. Collection.

Rhopalosiphum conii (Davidson)

The Honeysuckle and Parsnip Aphid

Aphis xylostei Schrank, 1801:107 (preoccupied).
Siphocoryne conii Davidson (W.M.), 1909:304 and 1914a:133 (disputed synonymy).*
Rhopalosiphum pastinacae (Linnaeus) (misidentification), Essig, 1911c:535; Gillette, 1911b:320.
Hyadaphis mellifera Hottes, 1930a:184.
Rhopalosiphum melliferum, Gillette and Palmer, 1932b:484; Essig, 1938:485 (syn. of *S. conii* Davidson).

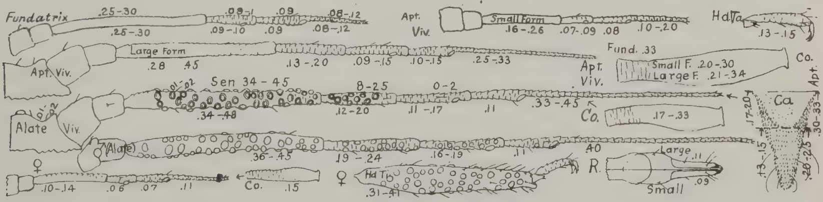

Fig. 250. *Rhopalosiphum conii*

Fundatrix. Pale yellowish, dusky on vertex and with pale greenish splotches on abdomen and often orange blotch about each cornicle base; appendages, cornicle and cauda pale shading to dusky distally. Body length 1.50; antenna .56-.66, III and IV coalesced. Otherwise as in summer apterous vivipara.

Apterous Summer Vivipara. Pale yellowish; appendages pale with dusky tips; cornicle, cauda and anal plate dusky to blackish. Body length 1.5-2; hind tibia .80-.85; hind tarsal II

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*Börner (1932:612) says *xylostei* Schrank is *sii* (Koch). If this is true Davidson's species is probably distinct since is does not show the dark dorsal markings described by Koch. After this manuscript was sent to the printer Börner's latest work (1952. Europae Centralis Aphides. Heft 4 und Mitt. Thuringischen Bot. Gesellschaft, Beiheft 3) came to hand. Börner states (p. 113) that *xylostei* Schrank is "*sii* CB. 1931/32 non Koch 1855." This statement removes the doubt of identity of Davidson's species with Schrank's. Also, Hottes has just called attention to the new name, *hyadaphis*, given by Kirkaldy (1905:416) for *xylostei* Schrank. This name would take precedence.

.13-.14; antenna .90; rostrum obtuse, attaining 2d coxa. *Small Form.* Body length 1.3-2; hind tibia .40-.65; antenna .50-.60; rostral IV+V .09.

Alate Vivipara. Head and thorax blackish; abdomen pale yellowish brown; appendages, cauda and cornicle dusky to blackish. Body length 1.3-1.5; hind tibia .90-1; hind tarsal II .13-.15; antenna 1.15-1.50, secondary sensoria strongly convex; rostrum hardly attaining 2d coxa. Hairs pointed, sparse; .02-.03 on tibia. Cornicle clavate, at middle nearly twice as wide as tibia, transversely rugose proximally, otherwise smooth, with flange. Cauda tapering, acute, bearing 2 pairs of lateral and 1 pair of dorsal hairs.

Ovipara. Apterous. Pale yellowish with head brownish; appendages, cornicle and cauda pale to slightly dusky. Body length .85-1.15; antenna .40, III and IV coalesced; cauda .10 on median line, .14 on side. Hind tibia strongly swollen on nearly entire length and bearing numerous rather large sensoria.

Male. Alate. Color same as summer alate vivipara or slightly darker and size slightly smaller.

Egg. Newly laid, pale greenish yellow; later, black. Size .51 by .22.

Collections. On leaves of *Lonicera* sp., *Xylosteum* sp. and *Symphoricarpos* sp. as winter hosts; dill *(Anethum graveolens)*, celery *(Apium graveolens)*, *Berula erecta, Cicuta* sp., *Conium maculatum,* carrot *(Daucus carota)*, *Heracleum lanatum* and parsnip *(Pastinaca sativa)* as summer hosts. Throughout region. Fundatrices May 11 to 26, apterous and alate summer viviparae June 3 to June 30 and Nov. 15 on winter host, June 19 to Sept. 10 on summer host; sexuales Nov. 7 to 12 on winter host, males also on summer host Sept. 27; rather common.

Type. Location unknown. Metatypes, Essig Collection.

Chief Distinguishing Characters. Absence of precaudal dorsal tubercle and presence of secondary sensoria on IV of alate vivipara.

Rhopalosiphum enigmae Hottes and Frison

Rhopalosiphum enigmae Hottes and Frison, 1931a:235; Gillette and Palmer, 1932b:482.

Apterous Summer Vivipara. Yellowish or greenish to reddish-brown or bronzy black, often with rusty blotch at base of each cornicle; cornicle black; antenna, cauda and legs brown, darker distally. Body length 2-2.4; hind tibia .90-1; hind tarsal II .14; antenna 1.05-1.30.

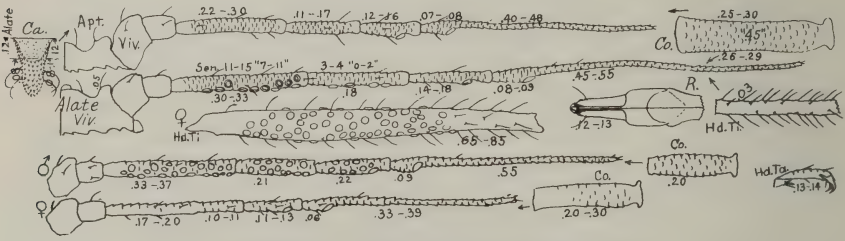

Fig. 251. *Rhopalosiphum enigmae*

Alate Vivipara. Head and thorax dark dusky brown; abdomen yellowish or reddish brown; antenna dark, lighter on base of III and unguis; cornicle, cauda and anal plate dark; tibiae yellowish brown with tip dark brown; tarsi blackish. Body length 1.80; hind tibia .95-1; antenna 1.35; cornicle distinctly wider than hind tibia; rostrum obtuse, attaining 2d coxa more or less. Frontal tubercles considerably developed, slightly exceeding vertex. Hairs pointed; .05-.07 on tibia; rather numerous. Cornicle slightly incrassate, suddenly constricted just before wide flange, slightly imbricated. Cauda parallel-sided, obtuse, bearing 2 hairs on each side. Lateral tubercles present but small. Fore wing with 2d fork of media very short, hardly a fifth the distance from margin of wing to 1st fork.

Ovipara. Apterous. Reddish-brown, lighter anteriorly and posteriorly; tibiae pale except tips; antenna and cornicle dark; cauda pale. Body length 2; antenna 1.16; with hind tibia .75-.85 long, moderately swollen for almost entire length and bearing numerous large sensoria.

Male. Alate. Color same as alate vivipara. Body length 1.66; antenna 1.50-1.60, III, IV and V bearing numerous sensoria.

Egg. Newly laid, pale yellowish; later, black; shining. Size .70 by .30.

Collections. On leaves or stems of *Typha latifolia.* Colorado: Fort Collins. Utah: Murray. Apterous summer viviparae July 11 to Oct. 8, alate viviparae Aug. 5 to 17, sexuales Oct. 8 to Oct. 30; not common.

Type. Ill. Nat. Hist. Surv., Collection, No. 10719.

This species is very close to R. *fitchii* but differs as follows: Color of body, somewhat longer unguis, thicker cornicle, longer hind tibia of ovipara and habit of wintering on *Typha latifolia.*

This form varies slightly from the original description of R. *enigmae* in smaller body, shorter antenna and cornicle, and more numerous sensoria in the alate vivipara. The limits of variation, however, of the two forms meet or overlap so that the erection of a distinct species for the Rocky Mountain form seems hardly justifiable.

Rhopalosiphum fitchii (Sanderson)

The Apple Grain Aphid (Plate VI)

Aphis mali Fabricius (misidentification), Fitch, 1855:49 (or 760); Weed, 1893:299.
Aphis fitchii Sanderson, 1902:137.
Aphis avenae Fabricius (misidentification), Matheson, 1919:750.
Aphis prunifoliae Fitch (misidentification), Baker, 1917b:410.
Rhopalosiphum prunifoliae, Baker and Turner, 1919a:311; Theobald, 1927:72; Gillette and Palmer, 1932b:486.

Fundatrix. Uniform yellowish green to whitish or with darker green markings in form of median line, cross dashes, and lateral margins with head and prothorax pale, often whitish; cornicle pale to brownish with black tip; cauda pale greenish yellow; appendages pale to sordid yellow with blackish tips and tarsi. Measurements as in summer aptera or a little larger.

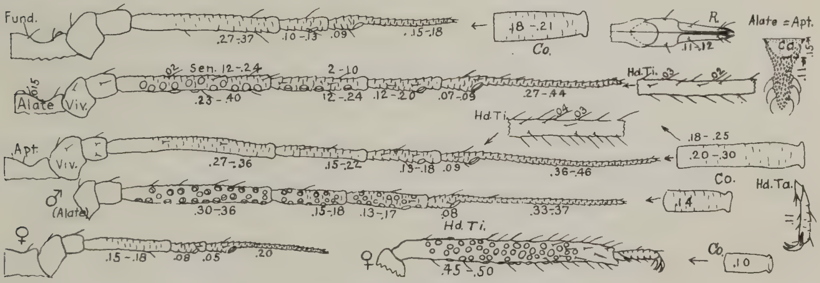

Fig. 252. *Rhopalosiphum fitchii*

Apterous Summer Vivipara. Young. Early instar, dull apple-green often tinged with carneous about and occasionally between cornicles; head dusky brown; two pairs of dorsolateral and one of lateral setigerous spots, on each segment, extending over thorax and abdomen; antenna pale proximally, dusky distally; legs pale. Cornicle short, broader than long. *Adult.* Yellowish green with darker green mottlings and with head and pronotum brownish and with orange area about cornicle base and on abdominal V and VI; cornicle sordid yellow to brownish and with black tip. Body length 1 to 2; hind tibia .90-1.10; antenna 1.1-1.4; rostrum obtuse, attaining 2d coxa.

Alate Vivipara. Alatoid Nymph. Pale apple-green, darker on dorsal bands and median line of abdomen, with orange stain at base of each cornicle; a pair of tessellated spots on abdominal I, II, III and IV. *Adult.* Head and thorax black; yellowish to olive-green, mottled, and with dusky lateral areas and slight median bands on abdominal VII and VIII and sometimes V and VI; and dusky blotch posterior to each cornicle base, sometimes rusty coloration anterior to cornicles; cornicle and legs pale or slightly dusky with black tips; antenna dusky throughout. Body length 1.4-1.8; hind tibia .90-1; hind tarsal II .11; antenna 1.1-1.4, secondary sensoria convex. Frontal tubercles distinctly produced mesally, but hardly exceeding vertex, which is convex. Hairs pointed, sparse, drooping. Cornicle cylindrical to slightly vasiform, slightly narrowed in middle and distinctly constricted just before the prominent flange, faintly imbricated; appearing weak, hardly wider in middle than hind tibia, somewhat impinged against body. Cauda elongated, parallel-sided, rather acute, slightly constricted near base with 2-3 hairs on each side.* Lateral tubercles present on prothorax and all abdominal segments except VIII. Media of fore wing with 2d fork short, from fourth to third the distance from margin of wing to 1st fork.

Ovipara. Apterous. Light to dusky green with head light to dusky and orange stain about each cornicle base; appendages brownish; cornicle dusky, cauda pale. Body length 1.40-1.50; antenna .55-.60, III and IV coalesced; hind tibia somewhat swollen along entire length and covered with rather large, nearly flat sensoria.

Male. Alate. Head and thorax blackish; abdomen olive-brown; antenna, cornicle and cauda dusky; legs brownish. Measurements about as in alate vivipara or a little smaller.

Egg. Newly laid, deep green; later, black. Size .53 by .30.

Collections. On leaves, (slightly curling them) and twigs of hawthorn *(Crataegus* sp.*)*, quince *(Cydonia* sp.*)* and apple *(Malus* sp.*)* for winter hosts and oat *(Avena sativa)* and wheat *(Triticum vulgare)* for summer hosts. Throughout region. Fundatrices April 12 to June 9, apterous summer viviparae on winter hosts April 28 to June 26, and Sept. 5 to Nov. 14, on summer hosts June 6 to Nov. 19; alate viviparae on winter hosts April 28 to June 23 and Sept. 5 to Nov. 4, on summer hosts June 20 to Dec. 26 (latter in insectary); sexuales on winter hosts and summer hosts Oct. 17 to Dec. 9; very abundant and often injurious on grain. Not a serious pest on the winter hosts since it does not strongly curl leaves and departs in the second generation in early summer, migrating to the grain.

Cotypes. Specimens used by Fitch (op. cit.) and referred to by Sanderson (op. cit.), U.S.N.M.

Chief Distinguishing Characters. Short 2d fork of media of fore wing, body coloration (green with darker bands and median and lateral line or mottling and with orange blotches about cornicle bases in young and aptera), early hatching of eggs (before buds start), black tip on the cornicle and habit of curling leaves little or none.

A. crataegella Theobald (1912:9, n.n. for *A. crataegi* Buckton 1877:35, not Kaltenbach) according to descriptions by both Theobald (1927:206) and Buckton differs in straight cornicles and absence of longitudinal green stripes and red blotches at cornicle bases. In the sense of Hille Ris Lambers (1934:28, No. 33) and according to specimens determined by Rogerson, supporting his publication (1947:157-76), Theobald's species differs as follows: Antenna in viviparae usually five-segmented and base of VI short (about .06 long) and abruptly joining the unguis, hairs semierect and rather conspicuous, cornicle in alate vivipara usually shorter than .20 and hind tibia in apterous vivipara not longer than .60.

From *A. padi* this species is separated with difficulty and only, as yet, by the following characters of *padi:* Definite mealy covering in apterous fundatrigeniae, body color in summer aptera (plain dark green to olive-brown), in fundatrigenia longer III (.45-.52), IV (.28) and V (.24-.26) but with unguis the same as in *fitchii,* the frequently once-forked media of fore wing and a different egg size (.566 by .26).

A. annuae Oestlund (1886:43) appears to agree fairly well, in all described characters, with the form here described but no darker green longitudinal line and red coloration about cornicles bases is mentioned. The types are not available for examination of characters not included in the brief description and since it is recorded only on *Poa* it is not certain that it is the apple form.

The types of *R. prunifoliae* (Fitch), alate viviparae, vary slightly from the Rocky Mountain specimens as follows: Cornicle shorter than .20 (.15-.18), sensoria fewer than 13 on III (7-12), hind tibia shorter than .90 (.70) and hind tarsal II shorter than .11 (.07-.08). However, since occasional small individuals of the form here described hardly differ from the above measurements no definite distinguishing line can be drawn between the plum and the apple forms; but since the form here treated has not been taken on plum in this region in forty years of collecting it appears advisable to use a name of an aphid described from apple.

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*Sanderson's figures are obviously in error as to the number of hairs on the cauda. Specimens used by Fitch (op. cit.) and referred to by Sanderson (op. cit.) show only 2 pairs of lateral hairs, in agreement with the form here described.

Rhopalosiphum grabhami Cockerell

Rhopalosiphum grabhami **Cockerell, 1903b:342; Gillette and Palmer, 1932b:483.**

Alate Vivipara. **Head and thorax black; abdomen dark olive-brown; tibiae pale with tips black; antenna, cauda and cornicle dark. Body length 2-2.20; hind tibia 1.1-1.2; hind tarsal II .09-.10; antenna 2.25, secondary sensoria convex; rostrum obtuse attaining between 1st and 2d coxae. Hairs slightly capitate. Cornicle club-shaped, at middle twice as wide as hind tibia and with flange. Cauda acute, tapering, hardly longer than wide, often appearing somewhat constricted near tip, bearing 2 lateral pairs and 1 dorsal pair of hairs.**

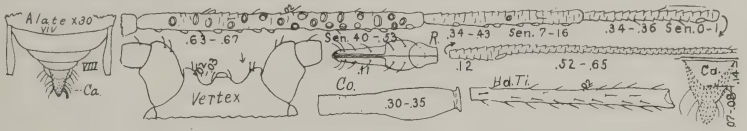

Fig. 253. *Rhopalosiphum grabhami*

Collections. On *Lonicera utahensis* and *involucrata*, curling leaves longitudinally. Colorado: Eldora and Cameron Pass. New Mexico: Pecos. Utah: Mount Timpanogos, Eden and Logan. Alatoid nymphs June 24, alate viviparae June 25 to July 26, oviparae Aug. 21; all collections consisting of numerous alate specimens; not common.

The fact that all the numerous viviparous individuals of the collections taken were alate forms is suggestive that migration to a summer host was taking place. *R. poae* on *Poa* agrees very closely with this species and might seem to qualify for the form on the alternate host but *poae* has not been taken on grass in the summer. More study is needed to settle the question.

Cotypes. U.S.N.M.

Rhopalosiphum maidis (Fitch)

Corn Leaf Aphid

Aphis maidis **Fitch, 1856:550; Forbes, 1885:25; Davis, 1909b:144; Wildermuth and Walter, 1932:1; Gillette and Palmer, 1932b:415.**
Rhopalosiphum maidis**, Webster, 1887:148.**

Apterous Summer Vivipara. **Pale bluish green, darker on area about cornicles, brownish anteriorly, darkest on head, old adult apterae darkest; covered with slight powder. Body length 1.30-1.75, rather slender; hind tibia .55-.60; hind tarsal II .09-.1; antenna .60-.70.**

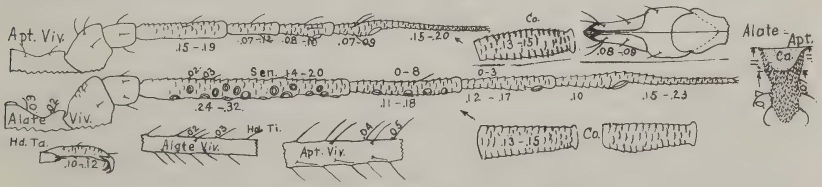

Fig. 254. *Rhopalosiphum maidis*

Alate Vivipara. **Head and thorax black; abdomen pale green with dusky lateral areas on abdominal segments anterior to cornicles, and dorsal dashes posterior to cornicles; cornicle, cauda and appendages dusky. Body length 1.77-2.5; hind tibia .75-.80; antenna .90-1; rostral IV+V broad, hardly attaining 2d coxa. Cornicle slightly incrassate, with slight constriction next to slight flange, imbrications slightly serrate. Cauda approximately parallel-sided with rounded tip and distinct but broad neck and bearing 2 or occasionally 3 hairs on each side.**

Hairs pointed; .02-.03 long, drooping and sparse on body. Lateral tubercles present but small. Fore wing with 2d fork of media unusually short, arising at hardly third the distance from margin of wing to 1st fork.

Collections. On leaves and stems of corn *(Zea mays), Sorghum vulgare* and the following grasses: Oat *(Avena sativa), Echinochloa crusgalli,* barley *(Hordeum vulgare), Panicum capillare, Setaria viridis,* and wheat *(Triticum vulgare).* Throughout region. Apterous and alate viviparae March 21 to Nov. 19; fairly common.

Cotypes. U.S.N.M.

Chief Distinguishing Characters. Color of body (bluish green without reddish coloration about cornicle bases), shape of cauda (approximately spoon-shaped) and number of lateral hairs on cauda (2 pairs), broad, short rostral IV+V (.09 by .05), number of sensoria on III of alate vivipara (14-18), length of unguis (.15-.26), and length of cornicle (.20-.30).

Genotype *Rhopalosiphum nymphaeae* (Linneaus)

The Waterlily Aphid

Aphis nymphaeae Linnaeus, 1761:260; Kaltenbach, 1843:104.

Aphis aquatica Jackson, 1908a:243; Davis, 1910a:245 (synonymy discussed).

Rhopalosiphum nymphaeae, Patch, 1912a:171 and 1915b:164; Davidson (W.M.), 1917a: 350; Theobald, 1927:60; Gillette and Palmer, 1932b:479.

Apterous Summer Vivipara. Light olive-green to golden brown; pulverulent on sides of head and prothorax; all appendages dusky except cornicle lighter proximally. Body length 2-2.30; hind tibia .95-1.10; antenna 1.20-1.50; rostrum obtuse, attaining 3d coxa.

Alate Vivipara. Color and measurements same as apterous vivipara except as figured. Cornicle clavate, swollen on distal half and with distinct flange, narrow portion with faint transverse wrinkles, otherwise smooth. Hairs pointed; .01-.02 on body. Cauda blunt, parallel-sided with slight neck, bearing 2 hairs on each side. Lateral tubercles small but present on prothorax and abdominal segments. Fore wing with 2d fork of media short, arising about quarter the distance from margin of wing to 1st fork.

*Ovipara.** Apterous. With hind tibia considerably swollen and bearing numerous sensoria.

*Male.** Alate.

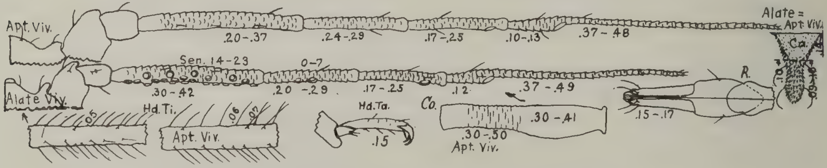

Fig. 255. *Rhopalosiphum nymphaeae*

Collections. As winter host, on leaves and stems of plum *(Prunus* sp.*);* summer hosts, on leaves and stems of *Berula erecta, Bidens* sp., *Ceratophyllum* sp., *Cicuta douglasi, Leersia oryzoides, Mimulus floribundus* (?), yellow pond lily *(Nuphar polysepala), Polygonum* sp., *P. punctatum, Ranunculus* sp., *Sagittaria* sp., *Scirpus* sp., *Typha latifolia* and *Veronica* sp. Colorado: Fort Collins, Longmont and Fruita. Utah: Blacksmith Fork Canyon, Garfield, Logan, Locomotive Springs and American Fork. Apterous and alate summer viviparae June 14 to Dec. 3; common.

Chief Distinguishing Characters. Green to olive-brown body, long rostral IV+V (.15), shape of cornicle and approximately spoon-shaped cauda.

*According to Theobald (op. cit.).

Rhopalosiphum padi (Linn.) (Kaltenbach)

The Oat Bird-cherry Aphid

Aphis padi Linnaeus, 1758:451 and 1761:259; Kaltenbach, 1843:74.
Rhopalosiphum prunifoliae (Fitch) (misidentification), Palmer, 1939:345.
Rhopalosiphum padi Rogerson, 1947:157.

Apterous Summer Vivipara. Nymph. Medium green with orange posteriorly. *Adult.* Head and prothorax yellowish brown; remainder of body blackish green to dark olive-brown; without powder; body surface reticulated; appendages, cornicle and rostrum ocher with dusky tips; tarsi brown to black. Body length 1.7; antenna 1-1.15, III .25-.30, IV .14-.17, V .10-.14, VI .08+.30-.38; cornicle .22-.30; hind tibia .50-.55; hairs short and inconspicuous; hind tarsal II .07-.09.

Alate Vivipara. Head and thorax black; prothorax green; abdomen light green with darker green medially and dusky lateral areas; all appendages dusky to blackish throughout. Body length 1.8-2; across eyes .47; antenna 1.30-1.45, III .38-.40, IV .20-.24, V .16-.19, VI .09+ .40-.43, sensoria 18-20 on III, 6-9 on IV, 1-2 on V; cornicle .22-.25; hind tibia .75-.90; hind tarsal II .08-.10; rostral IV+V .10-.11, attaining 2d coxa. Fore wing with 2d fork of media very short to absent. Cauda parallel-sided to slightly spatulate, bearing 2-3 pairs of lateral hairs and a single dorsal preapical one. Cornicle slightly clavate, lightly imbricated, nearly smooth. Hairs pointed, short and inconspicuous.

Collections. On wheat on leaves. Colorado: Yuma (cultured in greenhouse at Fort Collins) and Holyoke. Apterous viviparae Dec. 3 to Feb. 14, alate viviparae Dec. 3 (few) and Jan. 4 to Feb. 14 (abundant); rare.

Chief Distinguishing Characters. Orange coloration posteriorly, especially in nymph, number of sensoria on antenna of alate vivipara, length of antenna, especially III and unguis and frequent absence of 2d fork of media of fore wing.

For differences from *R. fitchii* see discussion under said species.

(Not figured on account of the very close similarity to *R. fitchii.*)

Rhopalosiphum poae Gillette

Gillette's Blue Grass Aphid

Rhopalosiphum poae Gillette, 1908b:61; Gillette and Palmer, 1932b:485.

Apterous Summer Vivipara. Brownish black to black; cornicle, cauda and appendages light to dark dusky. Body length 1.9; hind tibia 1; antenna 1.8-1.9; rostrum obtuse, attaining between 1st and 2d coxae.

Alate Vivipara. Brownish black throughout; appendages dusky; cornicle and cauda slightly dusky. Body length 1.8; hind tibia 1.10; antenna 2-2.40. Vertex distinctly convex; frontal tubercles developed mesially, distinctly exceeding vertex. Secondary sensoria tuberculate. Hairs distinctly capitate; .01-.015 on hind tibia. Cornicle club-shaped, with flange, distal half swollen, twice as wide at middle as hind tibia. Cauda tapering, not longer than broad, often appearing slightly constricted near tip. Lateral tubercles on prothorax.

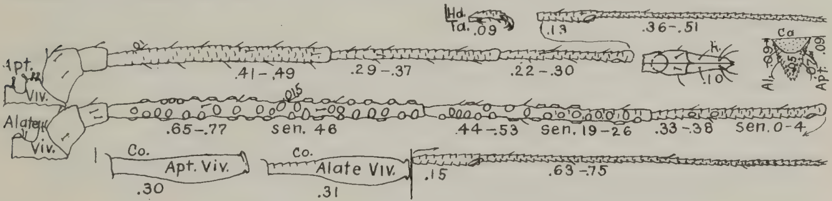

Fig. 256. *Rhopalosiphum poae*

Collections. On leaves and stems of *Poa* sp. Colorado: Fort Collins. Alate and apterous viviparae Oct. 15 to Apr. 28; rather common.

Type. U.S.N.M., No. 41947. Paratypes, Colo. Agr. Exp. Sta. Collection.

This species is very close to *R. grabhami* but differs in slightly longer antenna, shorter hairs and darker body. These differences, however, intergrade. The fact that both species have been found leaving their respective hosts in the spring as though migrating to a summer host obviates the theory that possibly both forms are but different generations of the same species. The decision of the question must await biological study.

Rhopalosiphum pseudobrassicae (Davis)

The Turnip Aphid

Aphis pseudobrassicae Davis, 1914a:231; Paddock, 1915:7; Davis and Satterthwait, 1916:915.
Rhopalosiphum pseudobrassicae, Gillette and Palmer, 1932b:487.

Apterous Summer Vivipara. Olive-green, yellowish to medium; with head, lateral areas and two longitudinal dorsal rows of large spots dusky, coarsely reticulated; shining; cornicle, cauda and appendages pale to dusky. Body length .85-1.66; across eyes .40-.43; hind tibia .63-.90; antenna .95-1.40; rostrum obtuse, attaining 2d coxa.

Alate Vivipara. Head and thorax blackish; abdomen dusky green, with blackish lateral areas on all segments anterior to cornicles and narrow dorsal bands posterior to cornicles; antenna blackish; cornicle, cauda and legs more or less dusky. Body length 1.40; across eyes .40; hind tibia .95-1; antenna 1.2-1.55; rostrum attaining between 1st and 2d coxae. Hairs blunt, sparse, inconspicuous. Cornicle slightly clavate, with flange and slightly imbricated. Cauda tapering on distal half, sometimes nearly parallel-sided, distinctly narrower than proximal portion and bearing 2-3 pairs of lateral hairs. Fore wing with 2d fork of media short, arising at quarter to third the distance from margin of wing to 1st fork.

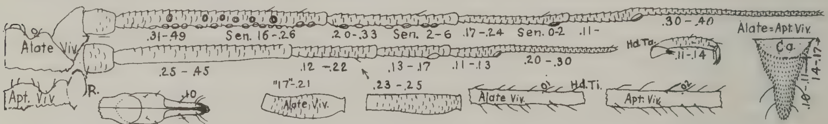

Fig. 257. *Rhopalosiphum pseudobrassicae*

Collection. On turnip *(Brassica rapa),* watercress *(Roripa nasturtium aquaticum),* radish *(Raphanus sativa), Capsella bursa-pastoris,* and stock *(Matthiola* sp.*).* Colorado: Denver, Loveland, and Fort Collins. Utah: Saint George. Wyoming: Wheatland. Alate and apterous viviparae all months of the year; not rare and in many cases very abundant and injurious in late summer and autumn.

Cotypes. Davis Collection.

Chief Distinguishing Characters. Large dark dorsal reticulated areas in aptera, absence of noticeable pulverulence, presence of sensoria on IV of alate vivipara, length of cornicle (twice or more times length of rostral IV+V).

This species is very close to *Aphis erysimi* Kaltenbach and may be identical. However, Kaltenbach describes his species as with antenna "gekörnt" in apterous vivipara and mentions no rows of dorsal dark spots in aptera. Specimens determined as *erysimi* by Hille Ris Lambers agree with Colorado specimens. Theobald (1927:209), however, states the two species to be distinct on account of differences in body marking and in cornicle length.

Rhopalosiphum rhois Monell

Monell's Sumach Aphid

Rhopalosiphum rhois Monell, 1879:27; Gillette and Bragg, 1915a:100; Gillette and Palmer, 1932b:488.
Amphorophora howardi Wilson, 1911a:59.
Rhopalosiphum howardi, Davis 1914a:165.

Apterous Summer Vivipara. Light rusty brown to greenish cadmium-yellow, lighter anteriorly and posteriorly; antenna beyond base of III, cornicle, tarsi and tips of tibiae blackish to black; legs brownish yellow; cauda pale. Body length 1.9-2; hind tibia .80-.88; hind tarsal II .11; antenna 1.25.

Alate Vivipara. Head and meso- and metathorax dusky; abdomen brownish to greenish cadmium-yellow to almost amber, with lateral areas on abdominal I, II, III and IV dark; legs dusky to black; cauda concolorous with body; cornicle black; antenna dusky beyond base of III. Body length 1.1-1.35; hind tibia .90-.95; hind tarsal II .11-.12; antenna 1.40-1.50, secondary sensoria flat, in single row, rostrum obtuse, attaining between 1st and 2d coxae. Hairs slightly capitate. Cornicle clavate, width at middle twice that of hind tibia, smooth and with flange. Cauda nearly parallel-sided, with slight neck, bearing two hairs on each side and one dorsal preapical one.

Ovipara. Apterous. Color as in apterous summer vivipara. Body length 1.50; hind tibia .66-.70; antenna 1-1.05. Hind tibia distinctly swollen on proximal two-thirds and covered with numerous sensoria.

Male. Alate. Color as in alate vivipara or darker and more green. Body length 1.66; other measurements as in alate vivipara.

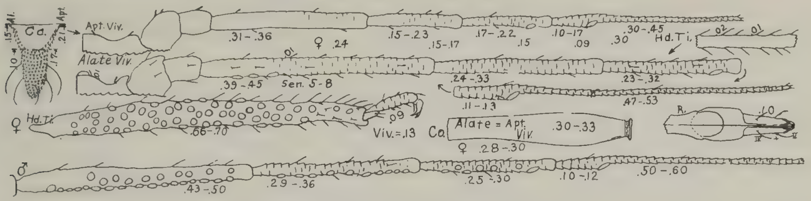

Fig. 258. *Rhopalosiphum rhois*

Collections. On *Rhus glabra* and *R. trilobata* as winter hosts; summer hosts: oat *(Avena sativa)*, *Echinochloa crusgalli*, *E.* sp., *Elymus canadensis*, barley *(Hordeum vulgare)*, timothy *(Phleum pratense)* and *Stipa* sp. Colorado: Trinidad, Manitou, Boulder and Fort Collins. Utah: Granite. Apterous summer viviparae on *Rhus* sp. June 6 to 19 and Aug. 31 to Oct. 12, on grasses July 12 to Aug. 19; alate viviparae on *Rhus* June 30 and Aug. 31 to Oct. 12, on grasses June 23 to Oct. 16; oviparae on *Rhus* Sept. 29; males on grass Oct. 4 to 16; rather common.

Cotypes. Davis Collection.

Chief Distinguishing Characters. Shape of the cauda (parallel-sided to slightly spoon-shaped, not tapering), smooth moderately swollen cornicle, about same length as IV in alate vivipara and small number of sensoria on III (2-8) in alate vivipara.

Rhopalosiphum rufomaculatum (Wilson)

The Pale Chrysanthemum Aphid

Aphis rufomaculata Wilson, 1908:261.
Siphocoryne artemisiae Del Guercio, 1913:177.
Stephensonia lahorensis Das, 1918:175.
Rhopalosiphum lahorensis, Takahashi, 1924:29; Theobald, 1929:339.
Rhopalosiphum rufomaculatum, Hille Ris Lambers, 1934:33 (synonymy); Gillette and Palmer, 1932b:489.

Apterous Summer Vivipara. Light apple-green with dusky to orange specks due to eyes of embryos showing through body wall; with yellow blotch at base of each cornicle; cornicle, cauda and anal plate dusky green. Body length 1.40-1.50; hind tibia .40-.55; hind tarsal II .09; antenna .80-.98; rostrum rather acute, attaining 2d coxa. Femora imbricated. Dorsum of body smooth to rugose.

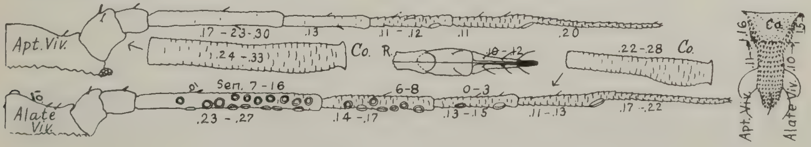

Fig. 259. *Rhopalosiphum rufomaculatum*

Alate Vivipara. Head and thorax dusky; abdomen apple-green with two dusky dashes caudad of cornicles; antenna, tarsi and tips of tibiae blackish; cornicle, cauda and anal plate slightly dusky; venation of wings slightly dusky. Body length 1.20-1.30; hind tibia .65; antenna .95-1.06; secondary sensoria nearly flat. Frontal tubercles rudimentary. Hairs blunt; .01 on antenna and hind tibia. Cornicle slightly clavate, slender, widest portion hardly wider than hind tibia and with distinct flange. Cauda parallel-sided, blunt, with tendency to constriction near base, bearing two pairs of lateral and a single dorsal preapical hair. Femora marked with imbrications. Prothoracic tubercles present.

Collections. On *Chrysanthemum* in greenhouse and on *Artemisia ludoviciana* and *A. vulgaris**. Colorado: Fort Collins. Utah: Logan and Salt Lake City. Apterous and alate viviparae Oct. 12 to March 10; fairly common.

The genus *Coloradoa* was erected by Wilson (1910:323) for this species but the characters, in the opinion of the writer, are not of generic rank. Specimens determined by Hille Ris Lambers as *Coloradoa artemisiae* (Del Guercio) appear identical with Wilson's species.

Chief Distinguishing Characters. Rudimentary frontal tubercles, imbricated femora, acute but not quite needlelike rostral IV+V and shape of cornicle (cylindrical in proximal portion and slightly to moderately swollen in distal half).

Rhopalosiphum scirpifolii Gillette and Palmer

Rhopalosiphum scirpifolii **Gillette and Palmer, 1932a:138 and 1932b:490.**

Apterous Summer Vivipara. Nymph. Dark olive-green to light green with orange stain between cornicles. ***Adult.*** Dark brown to greenish black, lighter laterally and anteriorly, sometimes orange spot at cornicle base; appendages, cornicle and cauda sordid to dusky, with black distally. Body length 2-2.25; hind tibia .85-1; hind tarsal II .13; antenna 1.10-1.25.

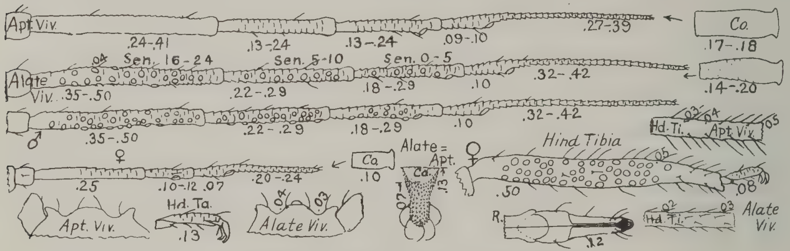

Fig. 260. *Rhopalosiphum scirpifolii*

Alate Vivipara. Head and thorax black; abdomen greenish black; antenna and cornicle black; legs and rostrum dusky; cauda and anal plate dusky. Body length 1.8-2; hind tibia .90-1.1; hind tarsal II .12; antenna 1.2-1.6; rostrum obtuse attaining 2d coxa more or less. Vertex distinctly covex; frontal tubercles developed about equal to vertex. Cornicle slightly incrassate with large flange, faintly imbricated, slightly wider than hind tibia. Cauda parallel-sided with slight tendency to constriction, blunt, bearing 2 hairs on each side and one preapical one. Hairs pointed; sparse on antenna; rather numerous on hind tibia. Lateral tubercles small, present on prothorax, and abdominal I and VII. Fore wing with 2d fork of media short, arising at quarter to third the distance from margin of wing to 1st fork.

Ovipara. Apterous. Color same as in apterous summer vivipara. Body length 1.50; hind tibia .50; antenna .65-.70. Hind tibia slightly swollen for most of length and covered with rather large, flat, round sensoria.

Male. Alate. Color and measurements same as alate vivipara except body length 1.30-1.50.

Egg. Newly laid, orange-yellow; later, black.

Collections. On leaves and stems of *Prunus besseyi* as winter host; on *Scirpus campestris* and *S.* sp. as summer host. Colorado: Fort Collins. Idaho: Blue Gulch. Apterous summer viviparae Sept. 26 to Oct. 29, alate viviparae Oct. 15 to 26, oviparae on *P. besseyi* Nov. 4, males on *Scirpus* and *Prunus* Oct. 7 to Nov. 2; apparently rare.

Type. U.S.N.M., No. 43848. Paratypes, Colo. Agr. Exp. Sta. Collection.

*The specimens taken on this plant (5 apterous and 3 alate viviparae) were smaller than the above-described examples, as follows: *Aptera.*—Body length .90-1.20; antenna .55-.65, III .12-.15, IV .08-.10, V .09, VI .09-.15; hind tibia .40-.50; hind tarsal II .07-.08; cornicle .22-.26; rostral IV+V .09, acute, attaining between 2d and 3d coxae. *Alata.*—Body length 1.10; hind tibia .60; hind tarsal II .09; antenna .85, III .24, IV .12, V .11, VI .12+.18; cornicle .24. Other characters were identical with form on *Chrysanthemum.*

This species differs from *R. fitchii* as follows: Considerably shorter cornicle (shorter than IV instead of equal to or longer than IV), less pronounced flange on cornicle, and length of cauda (shorter than base of VI instead of longer).

Rhopalosiphum serotinae Oestlund

Rhopalosiphum serotinae Oestlund, 1887:76; Gillette and Palmer, 1932b:491.

Fundatrix. Color as in apterous summer vivipara. Body length 1.77; hind tibia .70; antenna .80.

Apterous Summer Vivipara. Yellowish apple-green; appendages pale with dark tips; cornicle slightly dusky with dark tip; cauda pale brownish. Body length 1.50-1.90; hind tibia .75-.90; hind tarsal II .10; antenna 1.15-1.30; rostrum obtuse, IV+V slender, nearly attaining 2d coxa.

Alate Vivipara. Head and prothorax green; thoracic lobes brown; abdomen pale apple-green; cornicle pale dusky with dark tip; cauda pale brownish; appendages dusky; wings with venation heavy. Same in measurements as aptera except antenna 1.37, secondary sensoria large. Hairs blunt; on hind tibia .02. Cornicle smooth, strongly swollen except at end just proximal to swollen flange, and 3 times as wide as hind tibia. Cauda tapering, blunt, bearing 2 pairs of lateral and a single preapical hair.

Ovipara. Apterous. Color and measurements same as in apterous vivipara, with proximal third of hind tibia slightly swollen and bearing about 6 large sensoria.

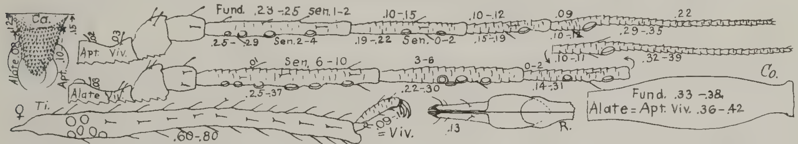

Fig. 261. *Rhopalosiphum serotinae*

Male. Apterous. Color same as in ovipara. Body length 1; hind tibia .50; antenna .85-.95, III .17-.18, IV .14-.16, V .13-.14, VI .07+.22-.27; a few secondary sensoria on III, IV and V; cornicle .26.

Egg. Newly laid, pale greenish yellow; later, black. Size .60 by .30.

Collections. On *Solidago* sp. Colorado: Denver, Boulder and Fort Collins. Utah: Hyrum and Logan. Fundatrices May 17, apterous summer viviparae May 18 to Oct. 2, alate viviparae June 15 to 23, sexuales Oct. 2 to 19; not rare.

Cotypes. Univ. of Minn. Collection.

This species has been made genotype of the genus *Cachryphora* by Oestlund. It seems to the writer that the characters are sufficient for a subgenus only.

Chief Distinguishing Characters. Strongly swollen cornicle with thick flange preceded by neck, short thick tapering cauda and presence of sensoria on III and sometimes on IV of apterous vivipara.

Rhopalosiphum splendens (Theobald)

The Mediterranean Grain Aphid

Siphocoryne splendens Theobald, 1915:116.
Rhopalosiphum splendens, Palmer, 1939:345.

Apterous Vivipara. Medium green, marked with red or orange about and between the bases of the cornicles; appendages, cornicle and cauda dusky to black. Length of body 1.2-1.5; antenna 1, III and IV unusually coalesced; hind tibia .65-.68; cauda nearly parallel-sided, bearing 2 pairs of lateral hairs; rostrum attaining abdominal I. Hairs erect; on side of abdomen .07-.09.

Alate Vivipara. Color same as in apterous vivipara except head and thorax which are black. Body length 1.5; hind tibia .85; antenna 1.25. Rostrum attaining 3d coxa or abdominal I. Hairs semierect; on side of body .02-.03. Cornicle incrassate to nearly cylindrical with rather heavy flange, imbricated. Cauda slightly spoon-shaped, bearing two pairs of lateral hairs.

Collections. On fall wheat *(Triticum vulgare)* and grass, in leaf bases and roots. Colorado: Julesburg, Rocky Ford and Holyoke. Alate and apterous viviparae Nov. 3 to Dec. 3; apparently not common.

Chief Distinguishing Characters. Unusually long erect hairs especially in aptera, extremely frequent fusion union of III and IV and body color (green with red about cornicle bases).

This species belongs to the *R. fitchii-padi* complex. For this group winter hosts are apple, *Crataegus, Prunus, Scirpus* and *Typha.* These plants were very rare or entirely absent in the infested localities and the aphids were apparently maintaining themselves in the viviparous state on the wheat as no sexuales were taken nor were there any great numbers of fall migrants evident. The specimens present were nearly all apterous.

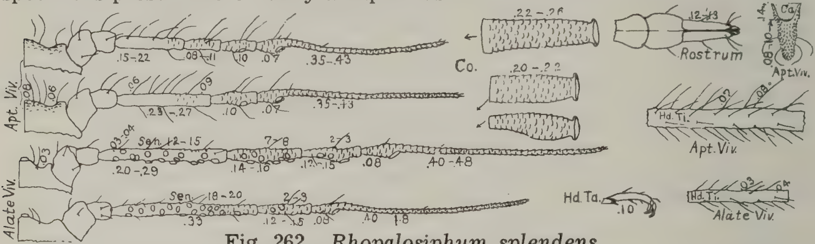

Fig. 262. *Rhopalosiphum splendens*

The form here described differs in the frequently five-segmented antenna from Theobald's description (where only a six-segmented condition is mentioned) and in the often six-segmented antenna from Mason's (1937:166) description of *Rhopalosiphum subterraneum* (where only a five-segmented condition is described) also from the latter in green body with red coloration about cornicles instead of brown body. Further study of variations in these two forms may prove *R. subterraneum* Mason to be a synonym of *R. splendens* (Theobald).

Rhopalosiphum subterraneum Mason

Rhopalosiphum substerraneum Mason, 1937:166.
Cerosipha californica, Essig, 1944:177.

This species may be the same as *R. splendens,* as the only difference seems to be the color in life. Body color in *R. splendens,* apterous vivipara and nymph, is "green with bright dark crimson about cornicle bases, sometimes obscure orange on abdomen." Body color in *R. subterraneum* is "brown" or possibly "grayish green," without mention of red coloration in descriptions by either Mason or Essig.

Collections. On roots and crown of wheat. Colorado: Bristol. Apterous viviparae Nov. 2; apparently rare but usually abundant and injurious where occurring.

Type. U.S.N.M. *Cerosipha californica* Essig, Essig Collection.

Genus **Siphonatrophia** Swain

Siphonatrophia Swain, 1918a:363; Baker, 1920a:51.
Minuticornis Knowlton, 1928c:60.

Characters. Frontal tubercles rudimentary; vertex convex. Antenna five-segmented in at least fundatrix and ovipara.* Secondary sensoria circular. Body of aptera strongly arched dorsally, flattened ventrally, hemispherical. Cornicle a slightly raised pore. Cauda elongate-tapering, ensiform. Fore wing with media once or twice-forked. Hind wing with both media and cubitus. Lateral tubercles not evident.

Genotype (monotypical), *Cerosipha cupressi* Swain.

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*The five-segmented antennal character appears to be of minor importance upon consideration of its variability in *S. gravida* Knowlton. Knowlton's form shows such striking agreement in all other characters except branching on media, that even specific distinction is somewhat uncertain.

Key to Species of Siphonatrophia

1. Antenna five-segmented; media of fore wing twice-branched (p. 225)........................*cupressi*
.... Antenna usually six-segmented in summer viviparae; media of fore wing once-branched (p. 225) ....*gravida*

[Genotype *Siphonatrophia cupressi* (Swain)]

Cerosipha cupressi Swain, 1918b:19.
Siphonatrophia cupressi, Gillette and Palmer, 1932b:492.

Apterous Summer Vivipara. Body length 1.15-1.29; antenna .51-.54, III+IV .137-.17, V .093-.102, VI .17-.204; cauda .187-.204; hind tarsal II .119; diameter of cornicle at base .035, diameter of opening .021.

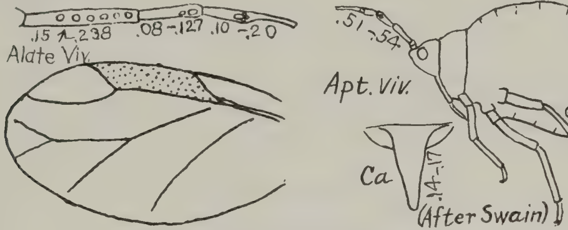

Fig. 263. *Siphonatrophia cupressi*

Alate Vivipara. Head and thorax dark; abdomen dark green; cauda and appendages pale or greenish. Body length .98-1.27; antenna .493-.646; hind tarsal II .102-.119. Frontal tubercles lacking. Antenna five-segmented, secondary sensoria circular, in single row, 5-8 on III, 1-3 on IV; rostrum attaining 2d coxa. Lateral tubercles not evident. Fore wing with media twice-forked and with 2d fork nearer to margin of wing than to 1st fork. Cauda long, ensiform, quite conspicuous, slightly longer than eighth of body, 1.5 times length of hind tarsal II. Cornicle a mere raised pore, very hard to distinguish.

Host. Cupressus guadelupensis and *C. macrocarpa.* (Not taken in region.)

Data for above description obtained from original description by Swain (op. cit.).

Siphonatrophia gravida (Knowlton)

The Hemispherical Juniper Aphid

Minuticornis gravida Knowlton, 1928c:60.
Siphonotrophia gravida, Gillette and Palmer, 1929a:12 and 1932b:493.

Fundatrix. Light-cedar green; tinged with dusky on head; shining; antenna, except terminal segments and tips of preceding ones, cauda and tibiae except tips pale; cornicle concolorous with body. Body length 1.25; hind tibia .35-.40; antenna .40-.46. Otherwise as in apterous summer vivipara.

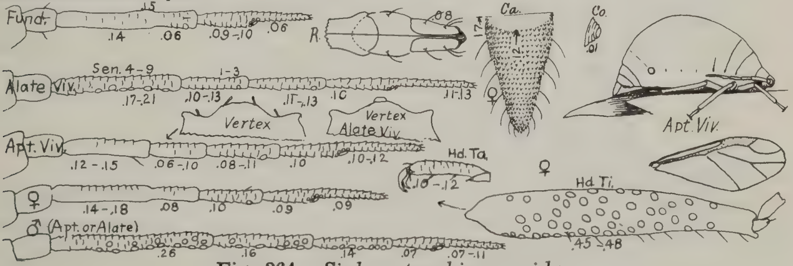

Fig. 264. *Siphonatrophia gravida*

Apterous Vivipara. Nymph. Yellowish green; appendages colorless; cauda short, triangular. Dorsum not pronouncedly convex. *Adult.* Cedar-green, imitating the cedar scales; all appendages pale with dusky tips. Body length 1-1.7; hind tibia .40-.45; antenna .60; rostrum rather than broadly obtuse, attaining 3d coxa or abdomen. Body hemispherical.

Alate Vivipara. Meso- and metathorax brown; rest of body as in apterous vivipara; stigma of fore wing pale. Body length 1.1-1.6; hind tibia .50-.55; antenna .66-.75. Hairs minute or not evident on body, very sparse, on legs .01; on cauda .03, slightly curved. Cornicle a mere pore on conical base. Cauda elongate-tapering, bearing about 7 hairs on each side. Fore wing with media once-branched.

Ovipara. Apterous. Color same as in apterous vivipara except hind tibia which is dusky throughout. Body length 1.43; hind tibia .45; antenna .63; cauda .17; with hind tibia strongly swollen and bearing large sensoria scattered throughout entire length.

Male. Alate or apterous. Body length .95; hind tibia .48; antenna .70, secondary sensoria 10 on III, 8 on IV, 6 on V; cauda .11. Other characters as in viviparae.

Egg. Sometime after being laid, black; shining. Size .66 by .30.

Collections. On leaves of *Juniperus scopulorum,* solitary. Colorado: Fort Collins. Utah: Logan. Idaho: Pocatello. Fundatrices April 21, apterous summer viviparae May 9 to Sept. 25, alate viviparae May 9 and Aug. 8, oviparae Oct. 11 and Nov. 6, males apterous Nov. 6, alate Oct. 11; probably common but quite difficult to find due to protective coloration, appressed position and solitary habit.

Cotypes. U.S.N.M. and Knowlton and Colo. Agr. Exp. Sta. Collections.

This species is separated from *S. cupressi* only by the six-segmented antenna in summer viviparae, once-branched media of fore wing and the difference in hosts.

Genus **Toxoptera** Koch

Koch, 1856:253; Baker, 1920a:51.

Characters. Same as for genus *Aphis* except as follows: Fore wing with media only once-forked and apterae often with short ventral process on frontal tubercle.

The wing character used for separating this genus from the genus *Aphis* is not entirely satisfactory since it does not appear in the apterous form. Börner (1931:10) splits this genus into two groups, setting *T. graminum* (Rondani) as genotype for his new genus *Schizaphis.* The character which he uses is the relative position of the lateral tubercles as to the spiracles. This point is difficult to determine and therefore, in the opinion of the writer, impractical. It seems less confusing to follow the established usage.

Genotype (monotypical), *Toxoptera aurantiae* Koch (=*aurantiae* Boyer de Fonscolombe).

Key to Species of Toxoptera

1. Cornicle shorter than IV (Not taken in region)........*aurantiae*
.... Cornicle as long as IV........2
2. Cornicle shorter than twice length of hind tarsal II; body black (p. 227)........*muhlenbergiae*
.... Cornicle as long as twice length of hind tarsal II; body not black........3
3. Cornicle hardly as wide as hind tibia, without reddish blotch about base (p. 226)........*graminum*
.... Cornicle slightly wider than hind tibia, with reddish blotch about base (p. 227)........*viridi-rubra*

Toxoptera graminum (Rondani)

The Green Bug (Plate VIII)

Aphis graminum Rondani, 1852:10.
Toxoptera graminum, Pergande, 1902:7; Webster and Phillips, 1912:1; Gillette and Palmer. 1932b:494.

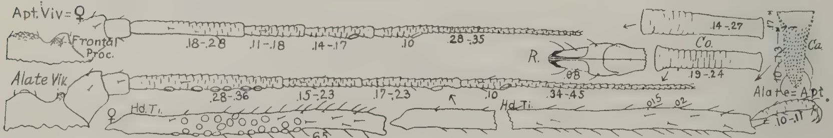

Fig. 265. *Toxoptera graminum*

Apterous Summer Vivipara. Head lighter than body, often pale straw; thorax and abdomen pale yellowish to bluish green with darker green longitudinal streaks medially and laterally; cauda pale; antenna dusky beyond base of III; legs and cornicle pale with dusky tips. Body length 1.35-2; hind tibia .45-.85; antenna .75-1.15; rostrum broadly obtuse, attaining between 1st and 2d coxae. Vertex distinctly convex, imbricated; frontal tubercles developed equal to vertex and bearing short fingerlike processes on ventral surface.

Alate Vivipara. Head and thoraric lobes light to medium brown to blackish; abdomen pale green with darker longitudinal streaks on median and lateral portions; antenna beyond base of III, femora, tips of cornicles and tibiae dusky to blackish; cauda and cornicle, except tip, pale yellowish. Body length 1.40-1.70; hind tibia .70-.95; antenna 1.1-1.3. Hairs pointed, sparse. Cornicle cylindrical, rather slender, with slight flange, proximal half with transverse wrinkles. Cauda elongate-tapering, bearing two pairs of lateral hairs. Lateral tubercles developed on prothorax and abdominal I and VII.

Ovipara. Apterous. Color and measurements as in summer apterous vivipara except hind tibia which is blackish and but slightly swollen on middle half and bearing about 23 rather large flat sensoria.

Male. Alate. Color and measurements as in alate vivipara except as follows: Body length 1.2; hind tibia .60 and antennal III, IV and V bearing numerous sensoria.

Collections. On wheat, oat, barley and *Agropyron* sp. Colorado: Throughout the eastern part of state. Utah: Circleville. Apterous summer viviparae April 2 to Aug. 24, alate viviparae April 2 to Oct. 30, sexuales Oct. 17 to 24; common, often in injurious numbers.

Toxoptera muhlenbergiae Phillips and Davis

Toxoptera muhlenbergiae Phillips and Davis, 1912:9.

Apterous Summer Vivipara. "Pale green"; antenna beyond base of III and legs, especially at tips of tibiae, dusky. Body length 1.2-1.4; across eyes .34-.38; hind tibia .42-.50; antenna .78-.85; rostrum attaining 2d coxa. Cornicle cylindrical and without distinct flange. Cauda tapering to slightly spatulate and bearing 2 pairs of lateral hairs. Vertex produced in center and imbricated.

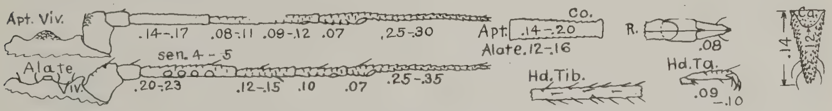

Fig. 266. *Toxoptera muhlenbergiae*

Alate Vivipara. Head and thorax dark; abdomen "pale green, pale around cornicle base"; antenna beyond base of III and legs dark. Body length 1-1.45; across eyes .35; hind tibia .60; antenna about 1.

Collections. On *Hordeum* sp. Colorado: Fort Collins. Apterous viviparae July 24, alate viviparae July 26 and Aug. 27; rare.

Cotypes. U.S.N.M.

Chief Distinguishing Characters. Short antenna (III not longer than 3 times rostral IV+V), short cornicle (once to twice rostral IV+V) and small number of sensoria (not more than 5 on III of alate vivipara).

Toxoptera viridi-rubra Gillette and Palmer

Toxoptera viridi-rubra Gillette and Palmer, 1932a:136, and 1932b:495.

Fundatrix. Reddish brown or mahogany, mottled with paler color; cauda slightly dusky; cornicle and tarsi black; antenna dusky throughout; tibiae pale except tips. Body length 2.10; hind tibia .66; hind tarsal II .09; antenna 1.10, III and IV coalesced. Otherwise as in apterous summer vivipara.

Alate Vivipara. Head and thorax black; abdomen reddish-brown or olive-green with orange stain about and between cornicle bases, with dusky lateral areas; antenna dusky throughout; cornicle black; cauda pale; anal plate dusky; legs mostly pale yellow. Body length 1.1-2; hind tibia .77-.90; hind tarsal II .09; antenna 1.4-1.5, secondary sensoria flat, arranged in single row along almost entire length of III; rostrum rather broadly obtuse, attaining nearly to 2d coxa. Hairs on vertex slightly capitate; on antenna and hind tibia pointed.

Apterous Summer Vivipara. Body 2 by 1.25; hind tibia .80; hind tarsal II .09; antenna 1.35; rostrum as in alate vivipara. Vertex slightly convex; frontal tubercles exceeding vertex by .02, each bearing a rudimentary fingerlike projection. Hairs on vertex slightly capitate; on antenna pointed; on hind tibia pointed, longer than diameter of tibia. Cornicle cylindrical with tendency to constriction next to distinct flange, imbricated, at least as wide as hind tibia, often slightly wider. Cauda blunt, parallel-sided to spoon-shaped, bearing 2 pairs of lateral hairs and a single dorsal preapical one. Lateral tubercles evident on prothorax and all abdominal segments except V and VIII.

Ovipara. Apterous. Same as apterous summer vivipara except hind tibia somewhat swollen in middle and rather thickly covered with irregular-sized, nearly flat sensoria on middle half to two-thirds.

Male. Alate. Measurements same as alate vivipara except as figured.

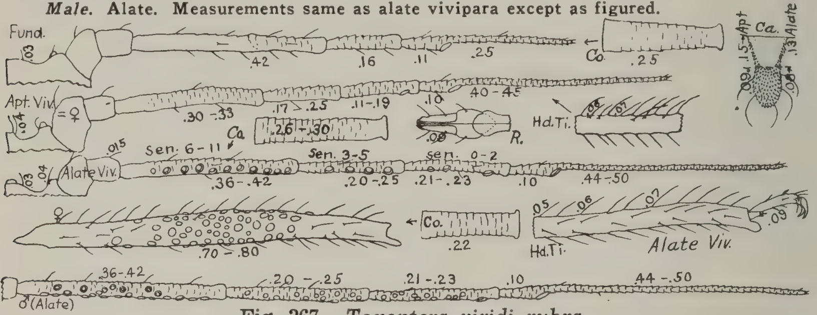

Fig. 267. *Toxoptera viridi-rubra*

Collections. On leaves and stems of *Carex nebraskensis.* Colorado: Fort Collins. Fundatrices April 26, apterous summer viviparae May 12 to Nov. 9, alate viviparae May 12 and 17, sexuales Nov. 9 to 23; apparently not abundant.

Types. U.S.N.M., No. 43847. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Color of body (dark green with reddish at least about cornicle base), rather spoon-shaped cauda, robust cornicle (usually slightly wider than hind tibia), short, cylindrical cornicle, rather spoon-shaped cauda and length of antenna (III always at least three-quarters of length of unguis and always longer than cornicle, even in aptera).

Genus **Zyxaphis** Knowlton

Knowlton, 1947a:35.

Characters. Frontal tubercles hardly developed. Antenna six-segmented, often with III and IV partly coalesced; secondary sensoria circular to subcircular. Cornicle truncate, not longer than wide. Cauda broadly and bluntly triangular to semilunar, bearing rather numerous hairs. Lateral tubercles on abdomen prominent. Cuticula of abdomen with reticulate areas on dorsum. Fore wing with media twice-branched. Hind wing with media and cubitus. Genotype (monotypical), *Zyxaphis utahensis* Knowlton.

Genotype *Zyxaphis utahensis* Knowlton

Zyxaphis utahensis Knowlton, 1947a:35.

Alate Vivipara. (Cleared and mounted), the following parts dark: Head and thorax, lateral areas on abdomen, legs except middle two-thirds of tibiae, entire antenna, cornicle, cauda and rostral III, IV and V. Body length 1.50; across eyes .30; antenna about .60-.64, III and IV frequently more or less coalesced; hind tibia .50-.60; rostrum attaining 3d coxa. Lateral tubercles large, present on prothorax and all abdominal segments. Hairs on body sparse, .015 long on sides of abdomen; on antenna hardly perceptible, very sparse and .005 long; on vertex .03. Dorsal body surface reticulated. Cornicle truncate, broader than long. Cauda broad, triangular to semilunar and bearing 4 pairs of lateral hairs.

Collections. On *Artemisia tridentata.* Utah: Mount Carmel. Alate viviparae, May 24; rare.

Type. Knowlton Collection.

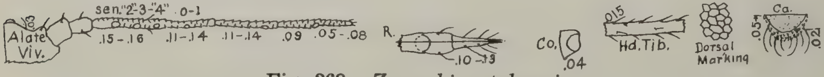

Fig. 268. *Zyxaphis utahensis*

Subtribe **Macrosiphina** Baker

Baker, 1920a:53.

Characters. Frontal tubercles well developed, usually distinctly exceeding vertex (excepting *Kakimia* and *Macrosiphum coweni* complex). Antenna six-segmented, as long or longer than body; secondary sensoria circular. Hairs on body blunt to capitate or funnel-shaped; (except in *Artemisaphis, Bipersona* and *M. coweni* complex); on antennal III to VI and tibiae usually simple, never much longer than diameter of segment bearing them. Lateral tubercles inconspicuous or absent. Cornicle elongate, usually longer than hind tarsus, often 4 times, with reticulated area on distal end. Rostral IV and V coalesced. Tarsal I approximately triangular. Fore wing with media twice-branched. Hind wing with both media and cubitus. Cauda usually longer than hind tarsus.

Key to Genera of Macrosiphina

1. Cauda slender, shorter than hind tarsal II.................... 2
.... Cauda not as above.................... 3
2. Cauda crenate, appearing twisted (p. 247).................... *Bipersona*
.... Cauda tapering but not crenate or appearing twisted (p. 246).................... *Artemisaphis*
3. Frontal tubercles each with fingerlike process (p. 344).................... *Phorodon*
.... Frontal tubercles without fingerlike process.................... 4
4. Frontal tubercles not greatly exceeding vertex.................... 5
.... Frontal tubercles greatly exceeding vertex.................... 9
5. Hairs distinctly capitate.................... 6
.... Hairs not distinctly capitate.................... 7
6. Cornicle with abrupt encircling indentation just preceding flange (p. 199) (in Aphina).................... *Durocapillata*
.... Cornicle not so, but normal (p. 248).................... *Capitophorus*
7. Frontal tubercles not pronounced, diverging, Aphislike.................... 8
.... Frontal tubercles pronounced and not diverging, often converging (p. 335).................... *Myzus*
8. Cornicle not reticulated (p. 275).................... *Kakimia*
.... Cornicle reticulated (p. 285).................... *Macrosiphum*
9. Cornicle clavate (p. 229).................... *Amphorophora*
.... Cornicle cylindrical (p. 285).................... *Macrosiphum*

Genus **Amphorophora** Buckton

Buckton, 1876:187; Baker, 1920a:54; Mason, 1925:2; Theobald, 1926:176.

Characters. Frontal tubercles prominent on median side, distinctly exceeding vertex; antennal I gibbous. Antenna as long or longer than body. Hind tibia nearly as long to longer than body. Hairs blunt to slightly capitate, short, on antennal III and hind tibia not as long as diameter of segment bearing them. Cornicle longer than cauda and more or less swollen. Cauda large, either tapering or constricted near base. Hind tarsal II short, never longer, usually distinctly shorter than base of VI. Macrosiphumlike in form. This genus differs from *Macrosiphum* in shape of cornicle and tendency for hind tarsus to be distinctly shorter than base of VI.

Genotype (monotypical), *Amphorophora ampullata* Buckton.

Key to Species of Amphorophora

1. Cornicle distinctly reticulated at tip.................... 2
.... Cornicle not distinctly reticulated at tip.................... 10
2. Unguis at least 5 times base of VI in length.................... 3
.... Unguis shorter than 5 times base of VI in length (p. 238).................... *morrisoni*
3. Rostral IV+V shorter than base of VI.................... 4
.... Rostral IV+V longer than base of VI.................... 9
4. Cauda bearing not more than 3 pairs of lateral hairs.................... 5
.... Cauda bearing more than 3 pairs of lateral hairs.................... 7
5. Cornicle longer than III (p. 232).................... *brevitarsis*
.... Cornicle not longer than III.................... 6
6. Sensoria on III of alata fewer than 25, in single row (p. 236).................... *goldamaryae*
.... Sensoria on III of alata 25 or more, not in single row (p. 238).................... *masoni*

7. Cornicle .75-.88 long (p. 232) .... *bonnevilla*
.... Cornicle 1.48-1.58 long.......... 8
8. Rostral IV+V .17-.19 long; sensoria on III of apterous vivipara 20 or more (p. 234) .... *crystleae*
.... Rostral IV+V .15 long; sensoria on III of apterous vivipara fewer than 10 (p. 243) .... *stanleyi*
9. Sensoria on III of alata more than 30 (p. 231).......... *arnicae*
.... Sensoria on III of alata fewer than 30 (p. 242).......... *rubicola*
10. Cornicle shorter than III.......... 11
.... Cornicle not shorter than III.......... 22
11. Cornicle conspicuously dilated in middle (p. 231).......... *ampullata*
.... Cornicle not conspicuously dilated in middle 12
12. Sensoria fewer than 20 on III of alata.......... 13
.... Sensoria more than 20 on III of alata.......... 14
13. Rostral IV+V .19 long (p. 245) .... *urtica*
.... Rostral IV+V .11 long (p. 236) .... *grindeliae*
14. Rostral IV+V .20 long (p. 240) .... *pawtincae*
.... Rostral IV+V shorter than .20.......... 15
15. Base of VI longer than hind tarsal II.......... 16
.... Base of VI not longer than hind tarsal II.......... 19
16. Sensoria present on III of aptera.......... 17
.... Sensoria absent on III of aptera (p. 233).......... *crataegi*
17. Sensoria 20-30 on III of aptera (p. 230).......... *agathonica*
.... Sensoria 7-20 on III of aptera.......... 18
18. Rostral IV+V .14-.16 (p. 241).......... *rubi*
.... Rostral IV+V .18-.19 (p. 244).......... *tigwatensa*
19. Hind tarsal II coequal with base of VI 20
.... Hind tarsal II longer than base of VI.......... 21
20. Sensoria usually absent on IV of alata (p. 240).......... *ribiella*
.... Sensoria present on IV of alata (p. 239).......... *nigricornis*
21. Sensoria 10-18 on IV of alata (p. 242).......... *sonchi*
.... Sensoria 2-4 on IV of alata (p. 234).......... *fronki*
22. Cauda with not more than 2 pairs of lateral hairs.......... 23
.... Cauda with more than 2 pairs of lateral hairs 24
23. Cornicle with greatest width less than twice that of narrowest part; sensoria 13-20 on III of alata.......... 26
.... Cornicle with greatest width twice that of narrowest part; sensoria 5-7 on III of alata (p. 237).......... *halli*
24. Cauda with 3 pairs of lateral hairs (p. 245).......... *utahensis*
.... Cauda with 4 pairs of lateral hairs 25
.... Cauda with 6-7 pairs of lateral hairs (p. 235).......... *geranii*
25. Sensoria fewer than 27 on III of aptera (p. 240).......... *ribiella*
.... Sensoria more than 27 on III of aptera (p. 240).......... *osborni*
26. Appendages black (p. 237) .... *janesi*
.... Appendages not black (p. 239) .... *nervata*

Amphorophora accidentalis Knowlton

Amphorophora accidentalis Knowlton, 1929c:39 (Description of alate male only).

Male. Alate. Antenna beyond base of III black; cornicle, cauda and anal plate more or less dusky. Body length 1.5; antennal III .66, IV .50, V .42, VI .09+.53, sensoria 24-37 on III, 12-15 on IV, 9-10 on V; hind tibia 1.3; cornicle .27, smooth and with prominent flange; cauda elongate, blunt and bearing 4-5 pairs of lateral hairs. Rostrum blunt, without the needlelike tip always found on aphids feeding on *Artemisia tridentata.*

Collections. On *Artemisia tridentata* (evidently accidental, as rostral tip is not the type found on aphids living on this host). Utah: Dry Lake. Alate male Aug. 10.

Type. Knowlton Collection.

Amphorophora agathonica Hottes

Hottes, 1950c:98.

Apterous Summer Vivipara. Pea-green without markings; antenna pale until beyond base of III, then dusky, becoming black on V and VI; cornicle pale at base, becoming dusky distally; rostrum and tibiae dusky, darker at tips; tarsi black; cauda and anal plate pale. Body length 3.3-3.8; across eyes .58-.60; across head before eyes .45; antenna 4.90; hind tibia 3.40-

3.95; rostrum attaining 2d coxa. Cornicle slightly swollen, without reticulation and nearly smooth. Cauda nearly parallel-sided and bearing 4-5 pairs of lateral hairs and one or two dorsal preapical ones.

Alate Vivipara. Head and thorax pale brown; otherwise about as in apterous vivipara except as shown in figure.

Collections. On *Rubus* sp. Colorado: Mesa. Alate and apterous viviparae, July 15 and 26; rare.

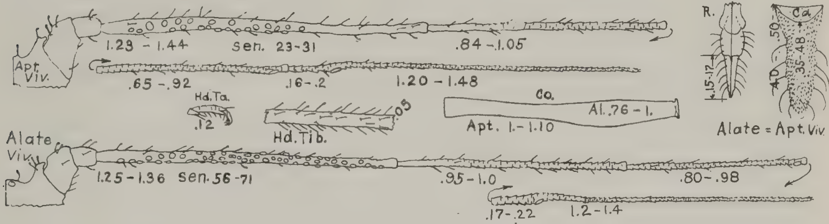

Fig. 269. *Amphorophora agathonica*

Chief Distinguishing Characters. Immaculate green body and light dusky to pale cornicle and legs, length of III (varying from shorter to longer than unguis), number of sensoria on III (at least 56 in alata, 20-31 in apterous vivipara), length of cornicle (shorter than unguis and longer than IV) and absence of reticulation on cornicle, length of rostral IV+V (.16-.17, about the same as base of VI and longer than hind tarsal II), length of cauda on median line (.40-.45) and number of lateral pairs of caudal hairs (4-5).

[Genotype *Amphorophora ampullata* Buckton]

Amphorophora ampullata **Buckton, 1876:187; Theobald, 1926:191; Mason, 1925:10.**

Apterous Vivipara. Green; slightly pilose; antenna and cornicle dark at tips; cauda and anal plate yellow; legs green except tips. Body length 3.3; antennal tubercles large and gibbous; antennal I very large, III bearing 30-34 round, thick-contoured sensoria extending over nearly the length of segment. Antenna much longer than body; III long, IV shorter than III but longer than V, VI long. Length of cornicle about three-fifths of that of III and thicker. Hairs on III capitate and shorter than the width of III. Cornicle conspicuously dilated in the middle, without reticulations or imbrications. Cauda thick, bluntly acuminate.

Host. On fronds of *Cystopteris montana* in a conservatory in England. Known only from the type slide which contains 3 apterous viviparae.

Type. Brit. Mus.

(Data for description taken from descriptions by Buckton, Theobald and Mason.)

Amphorophora arnicae Glendenning

Amphorophora arnicae **Glendenning, 1926:97; Hottes, 1933:9; Gillette and Palmer, 1934:135**

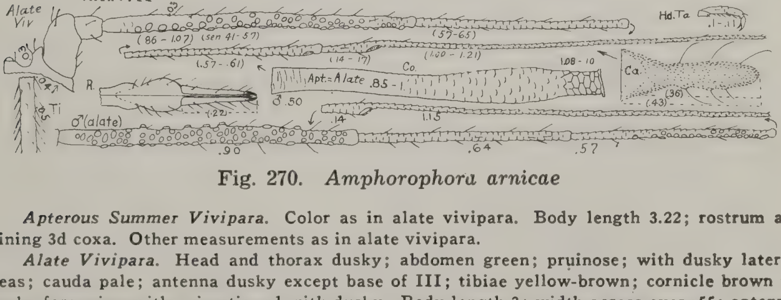

Fig. 270. *Amphorophora arnicae*

Apterous Summer Vivipara. Color as in alate vivipara. Body length 3.22; rostrum attaining 3d coxa. Other measurements as in alate vivipara.

Alate Vivipara. Head and thorax dusky; abdomen green; pruinose; with dusky lateral areas; cauda pale; antenna dusky except base of III; tibiae yellow-brown; cornicle brown to black; fore wing with veins tipped with dusky. Body length 3; width across eyes .55; antenna 3.20-3.80; hind tibia 2.3-2.6; rostrum attaining between 2d and 3d coxae; sensoria on III often not more than 35 visible. Hairs on vertex and antenna slightly capitate; .04 on side of body. Cornicle slightly swollen but constricted and reticulated just back of flange. Cauda parallel-sided with slight neck and bearing 3 pairs of lateral hairs.

Male. Alate. Color similar to alate vivipara. Body length 1.86; antenna 3.50; cauda .13 on median line, .17 on side.

Collections. On *Arnica* sp. Colorado: Pingree Park, Skyway, Gould, and Grand Mesa. Wyoming: Centennial. Alate (numerous) and apterous (very few) viviparae Aug. 15 to 23, males Aug. 16 to 20; apparently somewhat rare.

Cotypes. Canad. Nat. Collection at Ottawa.

Chief Distinguishing Characters. Green body, length of reticulated tip on cornicle (.08-.10 long), remainder imbricated, length of cornicle (about the same as III), number of sensoria on III of alate vivipara (35-57), length of rostral IV+V (.22) also its hairiness, rather long tibial hairs (.04-.05) and length of cauda (.36 and .43) and number of pairs of lateral caudal hairs (3).

This species is very close and almost certainly identical with *A. davidsoni* Mason, from thimbleberry *(Rubus* sp.). Furthermore, the fact that in latter part of August the individuals were practically all alate viviparae and alate males, the latter as recorded by Hottes (op. cit.), indicates that migration takes place to a winter host. However, this species is here retained as distinct awaiting exact observation proving the migration between *Rubus* and *Arnica.*

Amphorophora bonnevilla Knowlton and Allen

Amphorophora bonnevilla Knowlton and Allen, 1937b:309.

Alate Vivipara. "Green." (Mounted on slide), pale with all appendages pale except tarsi and tips of tibiae which are dusky. Body length 2; across eyes .45; antenna 3.50 and more (tip broken); hind tibia 2.20-"2.32"; rostrum attaining between 2d and 3d coxae. Cauda slender, tapering, bearing 4-5 hairs on each side.

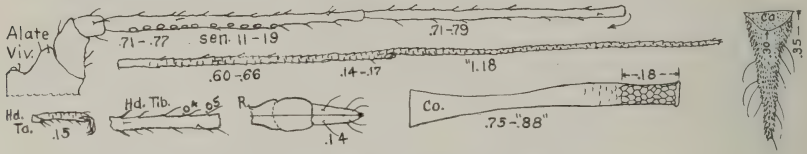

Fig. 271. *Amphorophora bonnevilla*

Collections. On red raspberry *(Rubus strigosus).* Utah: Farmington. Alate viviparae, June 11.

Type. Knowlton Collection.

Chief Distinguishing Characters. Length of IV (equal to III) and slender cauda.

Amphorophora brevitarsis Gillette and Palmer

Amphorophora brevitarsis Gillette and Palmer, 1933:356 and 1934:136.

Fundatrix. Head pale greenish buff; rest of body pale yellowish green or apple-green; cornicle and appendages pale with dark tips; cauda and anal plate pale. Measurements as in summer apterous vivipara except the following: Body length 2-2.75; hind tibia 1.64-1.90; antenna 2.65-3.

Apterous Summer Vivipara. Pale yellowish green to pale yellowish; all appendages pale with tarsi and tips of antenna and cornicle blackish. Body length 2-3; across eyes .47-.50; hind tibia 2-2.3; antenna 3-4.10; rostrum obtuse, slightly surpassing 2d coxa. Hairs blunt; on sides of abdomen .01-.02 and sparse. Lateral tubercles shallow. Cauda tapering, bearing 2-4 pairs of lateral hairs and 1-2 dorsal preapical ones.

Alate Vivipara. Head and thorax yellowish brown; abdomen pale yellowish green to pale yellowish; all appendages pale except tips of segments and of cornicles which are dusky to black. Measurements as in apterous vivipara except rostrum not surpassing 2d coxa.

Ovipara. Apterous. Same in color and measurements as apterous summer vivipara excepting hind tibia the proximal half of which is slightly swollen and bearing numerous small slightly convex sensoria and the cauda which is slightly shorter and broader.

Male. Alate. Color same as alate vivipara except the following: Abdomen with slightly dusky markings on lateral areas and dorsal bands on segments anterior to cornicles.

Egg. Newly laid, pale green; later, black. Size .70 by .35.

Collections. On leaves of *Clematis ligusticifolia.* Colorado: Fort Collins, Poudre Canyon and Whitewater. Fundatrices April 26 and 28, apterous summer viviparae July 1 to Sept. 25, alate viviparae July 18 to Sept. 25, oviparae Sept. 25 to Oct. 23, males Sept. 28 to Oct. 10; in small colonies or solitary; rather common but inconspicuous on account of protective coloration, concealed position under leaves and more or less solitary habit.

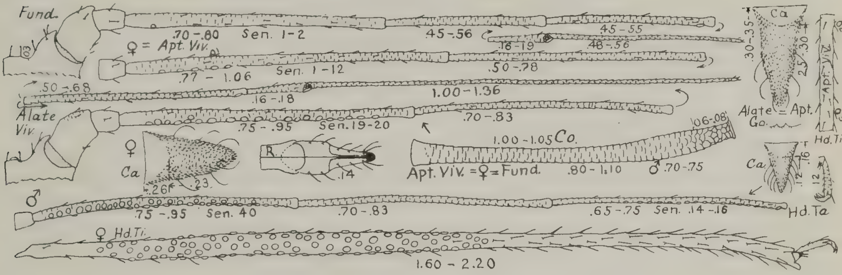

Fig. 272. *Amphorophora brevitarsis*

Type. U.S.N.M., No. 49292. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Pale green body, tapering cauda with 2-4 pairs of lateral hairs, sensoria on III (nearly in a single row and 20 in number in alate vivipara 1-12 in aptera), length of reticulated area on cornicle (.06-.08), length of rostral IV+V (.14) and short hairs on hind tibia (.02-.03).

Amphorophora crataegi (Monell)

The Four-spotted Hawthorn Aphid

Siphonophora crataegi Monell, 1879:20.
Macrosiphum crataegi, Patch, 1914a:255; Hottes and Frison, 1931a:304; Gillette and Palmer, 1934:137.

Fundatrix. First Instar. Head dusky; thorax sordid yellow; abdomen pale yellow with 2 longitudinal green lines on dorsum to abdominal VI; appendages and cornicle blackish. *Adult.* Light lemon-yellow with a pair of green dorsolateral lines extending from pronotum to abdominal VII; cornicle and appendages pale with dark tips; cauda pale. Measurements as in apterous summer vivipara, except antenna 2 and as figured.

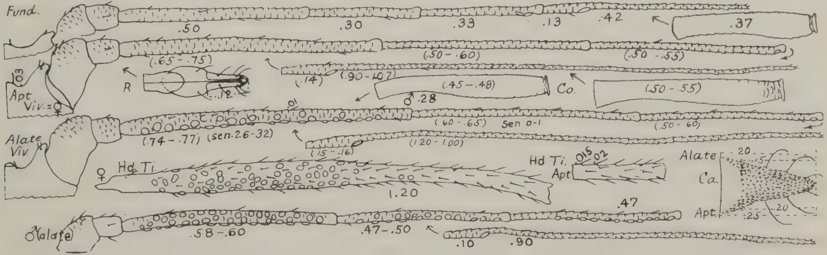

Fig. 273. *Amphorophora crataegi*

Apterous Summer Vivipara. Light lemon- to canary-yellow, with two pairs of grass-green spots, one on abdominal I and IV each; cauda, anal plate and cornicle pale; appendages pale with dark tips; tarsi black at tip. Body length 1.7-2.28; across eyes .45-.47; hind tibia 1.2, hind tarsal II .10; antenna 3-3.50; rostrum attaining 2d coxa. Cornicle moderately swollen in distal half and not reticulated. Cauda broad, tapering; rather acute and bearing 3 pairs of lateral hairs, one of these pairs close to tip.

Alate Vivipara. Head and thorax pale, brown to dark golden brown on thoracic lobes; abdomen lemon-yellow, marked with grass-green in 4 quadrate spots, 2 on dorsum of abdominal I and IV each; cornicle and cauda and anal plate pale; appendages blackish; rostrum and cornicle pale with dusky tip. Measurements same as in apterous vivipara except hind tibia which is 1 45. Hairs blunt to slightly capitate; on side of abdomen .015.

Ovipara. Apterous. Color a little darker than apterous vivipara; measurements about the same. Proximal half or more of hind tibia moderately swollen and bearing many sensoria.

Male. Alate. Color same as in alate vivipara. Body length 1.70; antenna 2.70; cornicle .28.

Egg. Newly laid, sordid pale greenish; later, black, shining. Size .80 by .36.

Collections. On leaves of *Crataegus* sp. Colorado: Denver and Fort Collins. Utah: Coalville, Logan, Hoytsville, Mount Timpanogos and Provo Canyon. Idaho: Hollister. Fundatrices May 18 to 30, apterous summer viviparae July 28 to Oct. 6, alate viviparae July 28 to Sept. 18, males Sept. 23 to Oct. 2, oviparae Sept. 23 to Oct. 18; rather common, infestations sometimes heavy and injurious.

Type. Davis Collection.

Chief Distinguishing Characters. Color of body (pale yellow marked with green in 2 longitudinal lines or 4 dorsal spots), imbricated surface of antenna especially I and II, short cornicle, without reticulation and moderately swollen on distal two-thirds, absence of sensoria on III of apterous vivipara, presence of sensoria on IV of the male and short, tapering cauda with 3 pairs of lateral hairs.

Amphorophora crystleae Smith and Knowlton

Amphorophora crystleae Smith and Knowlton, 1939:241.

Apterous Summer Vivipara. "Pale whitish-green." (Mounted on slide), pale throughout body and appendages, dusky only on tarsi and tip of rostrum. Body length 3-4.6; antenna 6.4-"6.9"; hind tibia "3.12"-4; rostrum attaining about to 3d coxa; cauda tapering, bearing 6-8 hairs on each side.

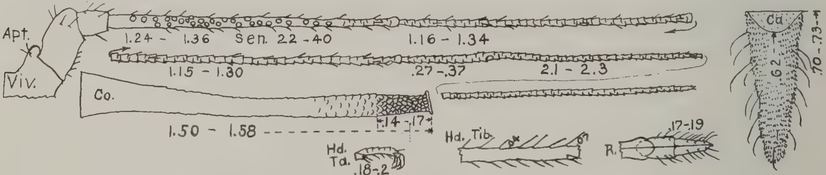

Fig. 274. *Amphorophora crystleae*

Male. Alate. "Body length 2.3-3.2; antenna 6.12-6.24, III 1.16, IV 1.13, V 1.14, VI .30+2.16, sensoria about as follows: 70 on III, 40 on IV, 33 on V; hind tibia 3.02; hind tarsal II .17; cornicle .91, reticulated area .12; rostral IV+V .15; hairs on antennal III .027; cauda .3, tapering and bearing 5-6 hairs on each side."

Collections. On leaves of *Lonicera involucrata.* Utah and Idaho: Beaver Creek area of Logan Canyon. Apterous viviparae July 25 and Aug. 22, alate males Aug. 22.

Chief Distinguishing Characters. Numerous sensoria (more than 15) on III in the apterous vivipara, long IV (as long as III) and fewer than 7 hairs on each side of cauda.

Amphorophora fronki Knowlton

Amphorophora fronki Knowlton, 1945b:206.

Apterous Summer Vivipara. "Green." (Cleared and mounted on slide), pale, with appendages pale except tarsi, distal third of cornicle, tips of tibiae and antennal segments and most of rostrum which are brownish. Body length 2.10-2.30-"2.40"; across eyes .46-.48; antenna about 3; hind tibia 1.60-2.00; rostrum attaining 3d coxa.

Alate Vivipara. "Green." (Cleared and mounted on slide), head and thorax brownish; abdomen pale; entire rostrum and appendages brownish; cauda and cornicle pale, the latter darker distally; tarsi and tips of tibiae blackish. Body length 2 or more; antenna 2.60-"2.75"; hind tibia 1.65-"1.72"; rostrum attaining 2d coxa. Cauda parallel-sided to slightly spoon-shaped, bearing 3-4 pairs of lateral hairs and one preapical one.

Ovipara. Apterous. Same in color as apterous vivipara. Body length about 2; antenna, cornicle and rostrum as in apterous vivipara. In all forms the frontal tubercles are rather shallow and the hairs distinctly capitate and curved. Proximal third of hind tibia somewhat swollen and bearing numerous rather large sensoria.

Collections. On foliage of "bedbug currant" *(Ribes nigrum).* Utah: American Fork. Alate and apterous viviparae and one apterous ovipara, July 25.

Type. Knowlton Collection.

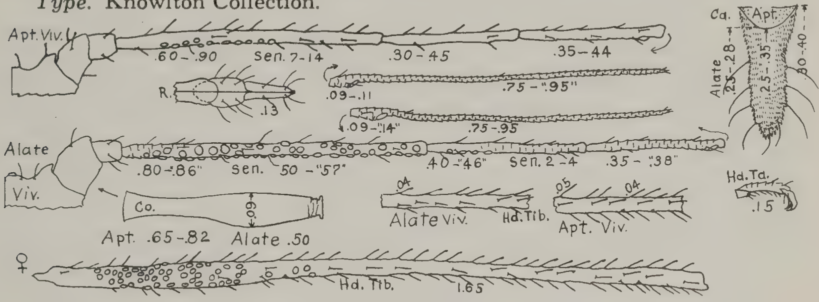

Fig. 275. *Amphorophora fronki*

This species resembles *A. petiolaris* Knowlton and Allen, appearing to differ only in the somewhat shorter cauda in alata (not .38-.44). Study of a larger number of specimens of both forms is necessary to decide whether they are distinct species. From *A. nigricornis* and *A. ribiella* this form is separated by more swollen cornicles (greatest diameter not less than .08 instead of .05-.07).

Amphorophora geranii Gillette and Palmer

The Wild Geranium Aphid (Plate IV, 7-8)

Amphorophora geranii Gillette and Palmer, 1929b:473 and 1934:138.

Apterous Summer Vivipara. Dull green-yellow to pinkish, mottled with sooty or grass-green; cauda pale; cornicle pale proximally, dusky on distal two-thirds; antenna dusky except I, II and base of III; legs pale brownish. Measurements as in alate vivipara except rostrum attaining 3d coxa.

Alate Vivipara. Head and meso- and metathorax brownish, remainder of dorsum dull green-yellow to grass-green and mottled with sooty green on abdomen especially on median line; cauda pale; cornicle pale proximally with distal two-thirds dusky; antenna dusky beyond base of III; legs pale brownish with tarsi and tips of tibiae black. Body length 2.6-3.65; across eyes .65; hind tibia 2.9; hind tarsal II .13; antenna 4; rostrum obtuse, attaining 2d coxa. Hairs slightly capitate; on side of body .05-.06. Cornicle slightly imbricated or smooth, slightly swollen in distal half. Cauda tapering and bearing 6-7 hairs on a side.

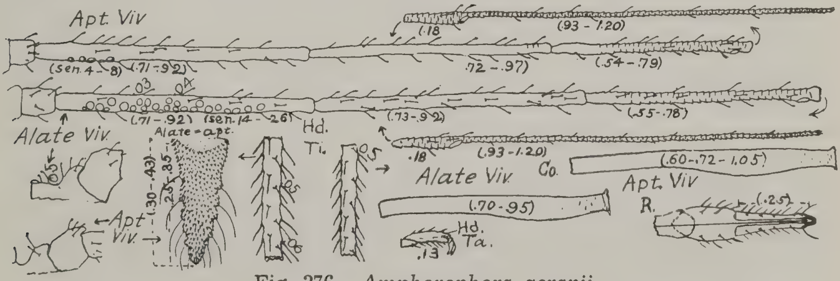

Fig. 276. *Amphorophora geranii*

Collections. On leaves of *Geranium richardsoni.* Colorado: Boulder, South Saint Vrain Canyon, Estes Park, Manitou, Mesa Lake, Lyons, Poudre Canyon. Idaho: Buhl. Apterous viviparae May 29 and Oct. 17, alate viviparae June 7 to July 16; rather common.

Type. U.S.N.M., No. 41922. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Comparative lengths of III and IV (about coequal), number of sensoria (14-26) on III of alate vivipara, smooth, unreticulated, slightly swollen slender cornicle (hardly wider than hind tibia), hairy, long (.25) rostral IV+V, rather bushy cauda (6-7 hairs on a side) and length of cornicle (about the same as III).

Amphorophora goldamaryae Knowlton

Amphorophora goldamaryae Knowlton, 1938a:13.

Apterous Summer Vivipara. (Mounted on slide), pale on entire body; cornicle, cauda and legs pale except tips of tibiae and tarsi which together with antenna beyond proximal two-thirds are more or less dusky. Body length "2-2.5"; across eyes .48; antenna about 3; hind tibia 1.80-"2.10"; rostrum attaining between 2d and 3d coxae. Cornicle slightly swollen, imbricated with imbrications closed just before tip. Cauda slender, tapering, bearing about 3 pairs of lateral hairs and one preapical one.

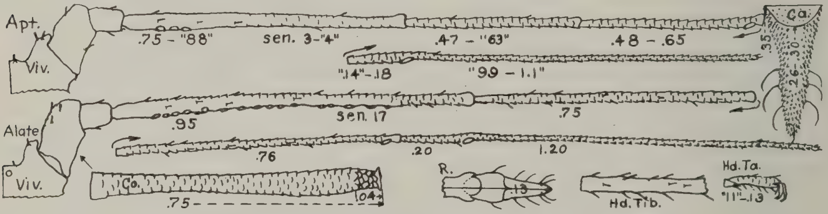

Fig. 277. *Amphorophora goldamaryae*

Alate Vivipara. Same as aptera except antenna, especially beyond proximal tenth of III, and tips of cornicle and tibiae dark to black. Body length 2.50; across eyes .50; antenna about 4; hind tibia 2.3-"2.5"; rostrum hardly attaining 2d coxa.

Collections. On *Solidago canadensis.* Utah: Logan and Brigham Canyons. Alate and apterous viviparae June 17.

Cotypes. U.S.N.M. and Knowlton Collection.

Chief Distinguishing Characters. Moderately swollen cornicle (at widest portion less than twice diameter of narrowest part), length of cornicle (about .75 long, shorter than to equal to III), length of reticulated area on cornicle (.03-.05), length of rostral IV+V (.13), number of sensoria on III (not more than 20 in alate vivipara, 3-4 in aptera) and their absence on IV, length of III (.75-.95) and length of IV (.50-.75, not longer than seven-tenths of III).

From *A. brevitarsis* this species differs only in the shorter cornicle (shorter than III, not .80-1.10 in aptera and not 1-1.05 in alate vivipara) and the shorter area of reticulation (not .06-.08). The two species are doubtfully distinct but, since the host plants differ radically, the two forms must be considered distinct awaiting transfer tests and migration observations.

Amphorophora grindeliae (Williams)

Siphonophora grindeliae Williams, 1910:81.
Macrosiphum (?) *grindeliae*, Davis, 1911b:31.
Amphorophora aridus Knowlton, 1929c:40 and 1945:111 (declared synonym).
Amphorophora grindeliae, Gillette and Palmer, 1934:138.

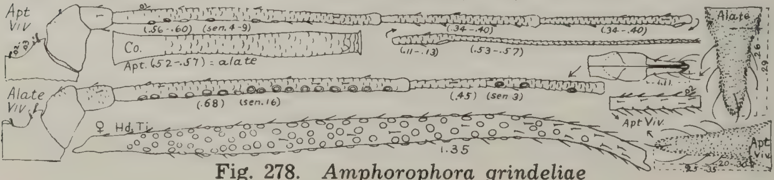

Fig. 278. *Amphorophora grindeliae*

Apterous Summer Vivipara. (Mounted in balsam), body immaculate; entire antenna slightly dusky beyond II or base of III; cornicle only slightly dusky, darker at tip; cauda and legs pale; rostrum dusky at tip. Body length 1.70; hind tibia 1.2-1.3; hind tarsal II .11; antenna 2-2.30; rostrum attaining beyond 2d coxa. Hairs slightly capitate; on side of body .01. Cornicle slightly swollen in distal half and with 2-3 rows of loose reticulations or close imbrications. Cauda elongate-tapering without noticeable constriction near base and bearing three lateral pairs of hairs and single dorsal preapical one.

Alate Vivipara. Same as apterous vivipara except rostrum attaining between 1st and 2d coxae and differences shown in figure.

Collections. On leaves of *Grindelia squarrosa.* Colorado: Fort Collins. Utah: Amalga, Garland, Granite and Beaver Dam. Apterous viviparae May 12 to June 21 and Sept. 29, alate viviparae May 20; rare.

Cotypes. U.S.N.M., No. 396 and Univ. of Neb. Collection, No. 142. *A. aridus,* Knowlton Collection.

Chief Distinguishing Characters. Slightly swollen cornicle with slight indefinite reticulation, number of sensoria on III of alate vivipara (fewer than 20), presence of 4-9 sensoria on III of apterous vivipara, short rostral IV+V (.11, hardly as long as base of VI).

Amphorophora halli Knowlton

Amphorophora halli **Knowlton, 1927:185.**

Alate Vivipara. "Yellowish green." (Mounted on slide), antennal VI and distal portions of III, IV and V and of cornicle black. Body length 2.35; across eyes .48; antenna about 3; hind tibia 1.7; rostrum hardly attaining 2d coxa. Cornicle swollen on distal half to about twice the diameter of the proximal portion, smooth and without reticulation. Cauda slender, tapering with slight narrowing near base, bearing 2 pairs of lateral hairs and a single dorsal preapical one. Hairs very short and inconspicuous.

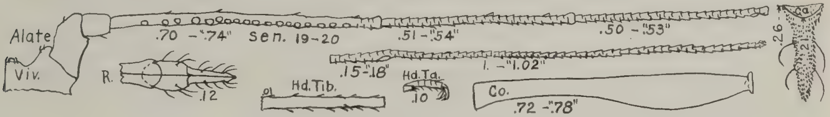

Fig. 279. *Amphorophora halli*

Collections. On *Betula fontinalis.** Utah: Smithfield Canyon. Alate vivipara Aug. 24; rare.

Type. Knowlton Collection.

This species differs from *A. nervata* only in the more swollen cornicle.

Amphorophora janesi Knowlton

Amphorophora janesi **Knowlton, 1938a:14.**

Apterous Vivipara. "Apple-green"; appendages and cornicle black. Body length 1.6-1.8; across eyes .38; hind tibia 1.0-1.2; hind tarsal II .11; antenna 2.2-2.3, III .49-.60, IV .34-.46, V .33-.36, VI .12+.65-.67-".70"; cornicle .62-.80; cauda .20 on median line, .25 on side; rostral IV+V .10-.12, attaining 2d coxa. Cauda tapering to slightly spoon-shaped, bearing 2 pairs of lateral hairs.

Alate Vivipara. Head and thorax dark; "abdomen apple-green"; antenna, cornicle and tibiae black; cauda pale. Body length 1.9; across eyes .38; hind tibia 1.28; hind tarsal II .11; antenna 2.15-"2.25", III .51, IV .43, V .40, VI .13+.55, sensoria 13 on III; cornicle .60; cauda .20 on median line, .25 on side; rostrum attaining 2d coxa.

Collections. Host unknown. Utah: Red Canyon. Alate and apterous viviparae May 2.

Type and paratypes. Knowlton Collection.

This species is very close to *A. nervata* and is distinguished only by slightly shorter measurements and the darker color of the appendages.

Not figured on account of similarity to *A. nervata* (Gillette).

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*The host may not certainly be *Betula.* Since only alate viviparae and apparently only a single specimen, were taken, the aphids or aphid might have been accidental.

Amphorophora masoni (Knowlton)

Neomyzus masoni Knowlton, 1928b:170.
Amphorophora masoni, Palmer, 1936b:741.

Apterous Summer Vivipara. "Bluish green"; cauda pale; cornicle pale with dusky tip; antenna beyond base of III and tibiae slightly dusky. Body length 1.8-2.15. Hind tibia 1.60-2.15; antenna 3-3.45; rostrum surpassing 2d coxa. Cornicle slightly swollen and with 3 rows of reticulations. Cauda tapering and without noticeable constriction.

Alate Vivipara. Same as apterous vivipara except as follows: Head and thorax dark; all tibiae and antenna beyond base of III blackish; hind tibia 1.60-1.90; antenna 2.80-3.35; rostrum attaining only 2d coxa.

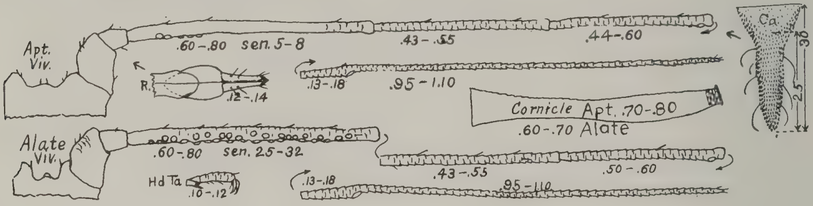

Fig. 280. *Amphorophora masoni*

Collections. On leaves of *Helianthus* sp. Colorado: Boulder and Skyway (in Mesa Co.). Utah: Tooele and Toquerville. Apterous summer viviparae Aug. 8 and Sept. 10, alate viviparae July 22; rare.

Cotypes. U.S.N.M. and Knowlton Collection.

Chief Distinguishing Characters. Length of cornicle (not greater than III), pale cornicle, slight amount of reticulation and faint or absent imbrications on cornicle, length of the cauda (not longer than .30) and number of lateral hairs (no more than 3-4 pairs), number of sensoria on III (in alate vivipara 25 or more and not in straight row, in aptera not more than 8) and length of rostral IV+V (about .13).

Amphorophora morrisoni (Swain)

The Long-legged Juniper Aphid

Nectarosiphon morrisoni Swain, 1918b:8 and 1919:78.
Amphorophora morrisoni, Mason, 1925:37; Gillette and Palmer, 1934:139.

Apterous Summer Vivipara. Green; cornicle, cauda and appendages pale. Body length 1.5-1.9; across eyes .43-.46; hind tibia 1.45-1.50; hind tarsal II .13-.15; rostrum attaining abdominal I. Hairs blunt or slightly capitate; on side of body .01. Cornicle slightly swollen on distal two-thirds and reticulated for about 5 rows at tip; cauda elongate-tapering with 3 pairs of lateral hairs.

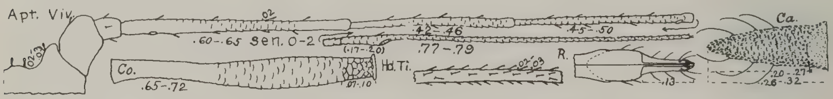

Fig. 281. *Amphorophora morrisoni*

Collections. On twigs of *Juniperus scopulorum.* Colorado: Fort Collins. Apterous viviparae Aug. 9; very rare.

Cotypes. Univ. of Calif. Collection, N. EOE 88.

Chief Distinguishing Characters. Cornicle with distinct reticulation at tip, length of cornicle (equal to or exceeding length of III), green body and small size (length not over 1.61), short cornicle (not longer than .68), and short III (not longer than .65). Also the coniferous host makes it unlikely that this form could belong to any of the species infesting non-coniferous plants.

Amphorophora nervata (Gillette)

The Rose and Bearberry Aphid

Nectarophora sp. Cowen (in Gillette and Baker) 1895:124, line 24.
Rhopalosiphum nervatum Gillette, 1908b:63.
Amphorophora nervata, Mason, 1925:43; Gillette and Palmer, 1934:139.

Fundatrix. Same as apterous summer vivipara except measurements of antenna and cornicle, as shown in figure.

Alate Vivipara. Head and thorax brown; abdomen pale green; antenna black except I, II and base of III; tibiae dusky, cauda and cornicle pale proximally, dusky distally; veins of wings black. Body length 2.10; across eyes .40; antenna 2.5-2.9; hind tibia 1.45; rostrum attaining 2d coxa. Hairs blunt, slightly capitate; not evident on body. Cauda with slight neck then tapering to a point, bearing 2 pairs of lateral hairs and one dorsal one.

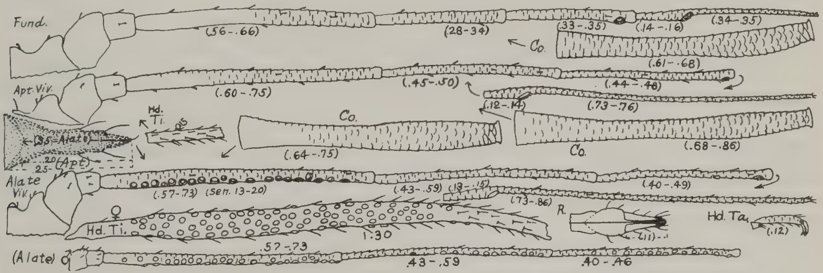

Fig. 282. *Amphorophora nervata*

Apterous Summer Vivipara. Pale green; antenna dusky; cauda, cornicle and hind tibia pale, with dusky tips. Hairs on vertex .03 long. Otherwise as in alate vivipara.

Ovipara. Apterous. Head and prothorax light orange-green, remainder of body dark or dusky green, lighter green on abdominal V and frequently on posterior abdominal segments. In some the entire body is pink; all appendages pale with dusky on tips of antennal segments, cornicle and tibiae. Measurements as in summer vivipara.

Male. Alate. Head and thorax yellowish brown; abdomen pale yellow, often with traces of yellowish brown dorsal bands; cornicle and appendages dusky to blackish. Body length 1.40; cornicle .55; other measurements as in alate vivipara. Sensoria slightly tuberculate.

Egg. Newly laid, bright green; later, black; shining. Size .71 by .33.

Collections. On leaves and twigs of cultivated rose and *Arctostaphylos uva-ursi.** Throughout region. Fundatrices April 6 to May 12, apterous viviparae May 12 to Oct. 13, alate viviparae May 12 to Oct. 8, sexuales Oct. 17; common.

Type. U.S.N.M., No. 26855. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Slightly swollen cornicle, absence of distinct reticulation on cornicle and presence of distinct imbrications on entire length, short rostral IV+V (.11, usually shorter than hind tarsal II), presence of sensoria on IV in male and absence of sensoria on antenna of aptera.

A. vaccinii Theobald is very close to this species and may prove to be a synonym.

Amphorophora nigricornis Knowlton

Amphorophora nigricornis Knowlton, 1927a:185; Knowlton and Allen, 1945a:112.

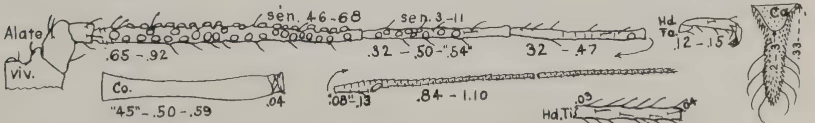

Fig. 283. *Amphorophora nigricornis*

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*No transfer tests have been done nor migration observations made with this host. Determined on apparent identity of structure only.

Alate Vivipara. "Dark." (Mounted on slide), pale except the following which are slightly dusky to black: Head, thorax, appendages, cauda, cornicle and tip of rostrum. Body length 1.8-2.5; across eyes .45-.50; antenna 2.43-3.26; hind tibia 1.60-2.10; rostral IV+V .14-.16, attaining 2d coxa. Cauda with slight neck, then tapering, bearing 3 pairs of lateral hairs and 2 dorsal ones.

Collections. On yellow and black currant *(Ribes aureum* and *R. nigrum),* and on *Polygonum persicaria* (accidental?). Utah: Kaysville, Fielding, Providence and Nibley. Alate viviparae June 9, Sept. 3 and 19; rare.

Chief Distinguishing Characters. Number of sensoria (on III more than 45, on IV 3-11) in alate vivipara, sculpture of cornicle (faintly imbricated), slender shape and dark color of cornicle and legs.

Amphorophora osborni Knowlton

Amphorophora osborni Knowlton, 1942c:143; Knowlton and Allen, 1945a:112.

This species agrees very closely with *A. ribiella,* judging from study of the type, a single apterous vivipara (apparently the only specimen taken) differing only in the larger number of sensoria "36-37" on III of aptera. The longer measurements of cornicle mentioned in original description were not evident in the type specimen. The number of sensoria on III of the apterous vivipara is a very variable character so this alone and on a single specimen found with typical individuals of *A. ribiella* is, in the mind of the writer, insufficient to make certain of distinct specific status. The form is at present tentatively left distinct awaiting collection of more such specimens together with alate viviparae associated in a colony indicating a genetic entity.

Type. Knowlton Collection.

Collections. On leaves of *Ribes aureum.* Utah: Cedar City. A single apterous vivipara June 15; very rare.

Amphorophora pawtincae Hottes

Amphorophora pawtincae Hottes, 1934:5; Palmer, 1936b:742.

Alate Vivipara. Head, thorax and abdomen light pea-green; ocelli, head and mesonotum bordered with brownish; cornicle and appendages light brown, cornicle green at base, brown at tip. Body length 3-3.7; antenna 4.4-4.5; hind tibia 3-3.1; rostrum attaining or surpassing 2d coxa. Cornicle with two rows of very faint transverse reticulations just before flange. Cauda tapering, bearing 3 pairs of hairs.

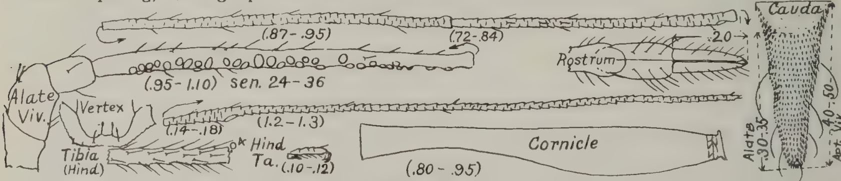

Fig. 284. *Amphorophora pawtincae*

Collections. On leaves, stems and flowers of *Primula parryi.* Colorado: Skyway, Grand Mesa (Mesa Co.). Alate viviparae July 12; rare.

Type. U.S.N.M. Paratypes, Hottes and Colo. Agr. Exp. Sta. Collections.

This species appears to be very similar to *A. rubi,* differing as follows: Appendages brownish instead of pale, length of rostral IV+V (.20 instead of .15) and number of sensoria on III of alate vivipara (fewer than 40).

Amphorophora ribiella (Davis)

The Ornamental Currant Aphid

Macrosiphum cynosbati Oestlund (misidentification), Davis, 1909a:38.
Macrosiphum ribiellum Davis, 1919:231.
Amphorophora ribiella, Gillette and Palmer, 1934:140; Knowlton and Allen, 1945a:114.

Apterous Summer Vivipara. Pale yellow-green; antenna dusky on I, II and III, tips of IV and V and entire VI; legs, cornicle except tip, and cauda pale. Body length 2; hind tibia 1.5; antenna 2.3-3.1; rostrum surpassing 3d coxa. Hairs slightly capitate or blunt; on side of body .03 and numerous. Cornicle very slightly swollen distal to middle, with close imbrications almost forming reticulations for 2-3 rows just proximal to flange. Cauda elongate-tapering, bearing 4 pairs of lateral hairs and one dorsal preapical one.

Alate Vivipara. Head and thorax pale brownish green to dark brown; otherwise color and measurements as in apterous summer vivipara except as follows: Rostrum barely attaining 2d coxa and hairs on vertex .02.

Ovipara. Apterous. Dusky markings and measurements about as in summer apterous vivipara except as follows: Cornicle .50, cauda .10 on median line and hind tibia about 1.40, slightly swollen on proximal third which portion is rather thickly covered with sensoria.

Male. Alate. Head to dusky; pronotum green; thoracic lobes dark brown; abdomen dark green to dark salmon or reddish brown; antenna, cornicle and legs pale to dusky with tips of segments blackish. Body length 1.60; cornicle .10; other measurements as in alate vivipara.

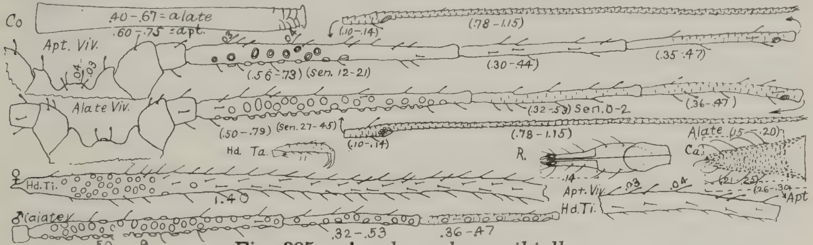

Fig. 285. *Amphorophora ribiella*

Collections. On leaves and twigs of *Ribes aureum.* Colorado: Fort Collins. Utah: Throughout state. Idaho: Twin Falls. Apterous and alate viviparae April 30 to Oct. 11, alate males Sept. 12 to Oct. 15, oviparae Oct. 15; common.

Type. Davis Collection.

Chief Distinguishing Characters. Feebly swollen cornicle, about same width as hind tibia; absence of dorsal patch on abdomen in alate vivipara, cornicle with flange not oblique and absence of sensoria on IV and V.

This species somewhat resembles *A. sonchi* but is distinguished by longer hairs and cornicle and absence of sensoria on IV and V in alate vivipara.

Amphorophora rubi (Kaltenbach)

The European Raspberry Aphid

Aphis rubi Kaltenbach, 1843:24.
Siphonophora rubi, Koch, 1855:191; Buckton, 1876:140.
Amphorophora rubi, Gillette, 1911a:381; Theobald, 1926:187; Mason, 1925:52; Gillette and Palmer, 1934:140.

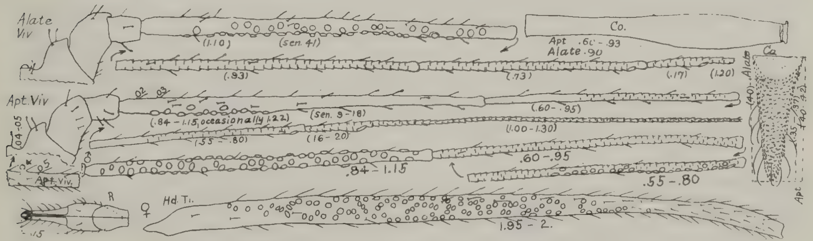

Fig. 286. *Amphorophora rubi*

Apterous Summer Vivipara. Green, often with darker median and lateral lines; all appendages pale; dusky on antennal V and VI and tips of III and IV, tarsi, tips of tibiae, cornicle and rostrum. Body length 2.5-3.3; hind tibia 2.5-3; hind tarsal II .09-.11; antenna 3.3-4.5; rostrum attaining 2d coxa. Hairs blunt to slightly capitate; on hind tibia .04-.05; on side of body .03. Cornicle moderately swollen on distal two-thirds and without reticulation but with 3 striae next to flange. Cauda elongate-tapering with 4-5 pairs of lateral hairs and one dorsal preapical one.

Alate Vivipara. Head and thoracic lobes dark, rest of body and measurements as in apterous vivipara except hairs on vertex which are .03 long.

Ovipara. Apterous. Same as apterous vivipara or smaller and with hind tibia slightly swollen for most of its length and thickly covered with sensoria.

Male. Alate. Same in measurements as alate vivipara, differing only in presence of sensoria on III and V.

Collections. On leaves (on underside) of red raspberry *(Rubus strigosus)* and black raspberry *(Rubus occidentalis)*, solitary. Throughout region. Apterous and alate summer viviparae June 25 to Oct. 12, oviparae Oct. 1 to Nov. 9, males Oct. 1; rather common.

Chief Distinguishing Characters. Absence of dusky spot on fore wing, cornicle length (shorter than III), without reticulation and pale, length of antenna (exceeding length of body) and length of rostral IV+V (somewhat shorter than base of VI).

Amphorophora rubicola (Oestlund)

The Spotted-winged Raspberry Aphid

Macrosiphum rubicola Oestlund, 1886:27 and 1887:78.
Amphorophora rubicola, Mason, 1925:58; Gillette and Palmer, 1934:141.

Apterous Summer Vivipara. Greenish yellow with median and lateral vittae of darker green; cornicle dark; antenna slightly dusky with III darker on proximal half and at tip; legs pale brownish with tarsi and tips of tibiae blackish; cauda pale. Measurements as in alate vivipara except rostrum attaining 3d coxa. Hairs on side of body .04-.05.

Alate Vivipara. Head and thorax dusky brown; abdomen pale greenish yellow, with green median and lateral lines; antenna, cornicle and legs blackish to black; cauda pale. Fore wing with dusky spot at tip, on margin. Body length 2.5-3; hind tibia 2.3-2.86; hind tarsal II .11; antenna 2.58-3.3; rostrum attaining 2d coxa. Hairs blunt to pointed. Lateral tubercles present on prothorax and abdominal II to V.

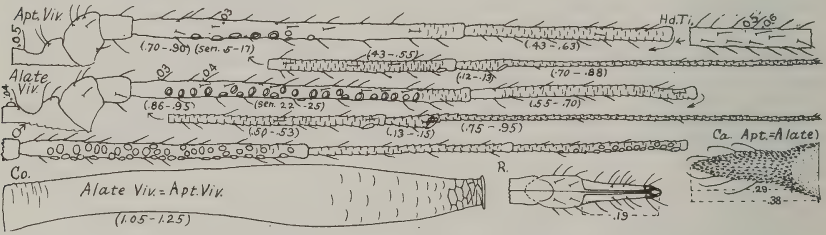

Fig. 287. *Amphorophora rubicola*

Male. Alate. Head and thorax dusky brown; abdomen reddish brown; cauda pale; other appendages blackish. Body length 2; hind tibia 2; cornicle .65; cauda .10; other measurements and spot on fore wing as in alate vivipara.

Collections. On leaves of red raspberry *(Rubus strigosus).* Colorado: Cherokee Park and Boulder Canyon. Utah: Mount Timpanogos. Idaho: Castleford. Apterous and alate viviparae Aug. 28 to Oct. 23, males Sept. 25; rare.

Cotypes. Univ. of Minn. Collection.

Chief Distinguishing Characters. Dusky spot on the tip of the fore wing, reticulated cornicle, width of the cornicle (greater than width of hind tibia) and its dark color and length of rostral IV+V (.19).

Amphorophora sonchi (Oestlund)

Rhopalosiphum sonchi Oestlund, 1886:34.
Rhopalosiphum dianthi (Schrank) (mistaken synonymy), Oestlund, 1887:76.
Rhopalosiphum sonchi, Gillette and Taylor, 1908a:34. footnote (discussion of mistaken synonymy).
Amphorophora cosmopolitana Mason, 1925:16.
Amphorophora sonchi, Gillette and Palmer, 1934:142; Knowlton and Allen, 1945a:114.

Apterous Summer Vivipara. Pale greenish; appendages pale. Body length 2-2.2; across eyes .43-.45; hind tibia 1.25-1.75; hind tarsal II .14-.15; antenna 2.4-2.73; rostrum surpassing 2d coxa. Otherwise as in alate vivipara.

Alate Vivipara. Head and thorax dark; abdomen greenish yellow, often pinkish especially in fall; with dusky lateral areas and dorsal patch; antenna black except base of III; legs and cauda pale; cornicle slightly dusky. Body length 2.5-3; across eyes .45-.49; hind tibia 1.45-1.9; rostrum attaining between 1st and 2d coxae. Hairs blunt to slightly capitate; on side of body .01 or not evident. Cornicle on distal half to two-thirds swollen to twice width at base, smooth and without reticulation but with rows of transverse imbrications next to flange. Cauda tapering, with slight indication of neck, nearing three pairs of lateral hairs.

Ovipara. Apterous. Pale yellow; cornicle and appendages sordid to dusky with tarsi, tips of antennal segments and of tibiae blackish; cauda pale. Measurements about as in apterous summer vivipara or antenna shorter, 1.40-2. Proximal half or more of hind tibia slightly swollen and bearing numerous sensoria.

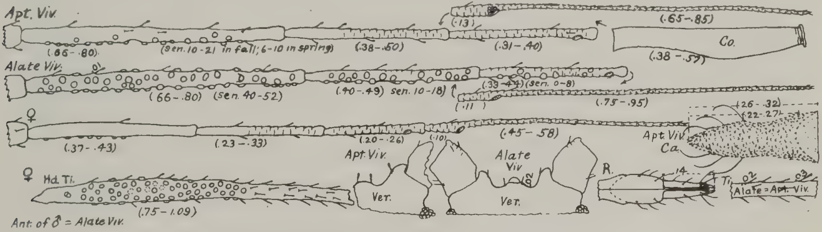

Fig. 288. *Amphorophora sonchi*

Male. Alate. Head and thorax blackish; abdomen yellow-brown, with heavy dorsal bands on III, IV and V; appendages dusky brown; cornicle and cauda pale brownish. Measurements about as in alate vivipara. Sensoria present on III, IV and V.

Egg. Newly laid, sordid to pale honey-yellow; later, black. Size .70 by .30.

Collections. As winter host, on leaves of golden currant *(Ribes aureum)* and black currant *(R. nigrum)*, not causing red blisters; as summer hosts, leaves of celery *(Apium graveolens)*, sow thistle *(Sonchus oleraceus)*, wild lettuce *(Lactuca* sp.). Throughout region. Apterous summer viviparae on *Ribes* June 9 to July 2, on summer hosts July to Oct. 27; alate viviparae on *Ribes* June 9 to 11 and Sept. 29 to Nov. 7, on summer hosts July 21 to Oct. 20; oviparae on *Ribes* Sept. 29 to Nov. 7; alate males on *Ribes* and summer hosts Sept. 29 to Nov. 7; common.

Cotypes. Univ. of Minn. Collection.

Chief Distinguishing Characters. Numerous tuberculate sensoria present on III, IV and V in alate vivipara and also on alate male, presence of sensoria on III in apterous vivipara and ovipara, smooth, non-reticulated cornicle, swollen on distal two-thirds to twice width at base and dorsal patch on abdomen of alate vivipara.

Determination of this species was aided by examination of Oestlund's type specimens kindly loaned by H. E. Milliron. Oestlund's specimens are certainly not *M. persicae* and he was mistaken in proclaiming them as such (1887:76).

Amphorophora stanleyi (Wilson) n. comb.

Macrosiphum stanleyi Wilson, 1915b:82; Gillette and Palmer, 1934:197.

Apterous Summer Vivipara. "Light yellowish green," (mounted in balsam), body immaculate; all appendages pale except tips of tibiae, rostrum and antenna and entire tarsi which are blackish. Body length 2-4.4; across eyes .65; hind tibia 2.5-3.5; hind tarsal II .15-.16; antenna 5-6; rostrum attaining or surpassing 2d coxa. Hairs slightly capitate; on side of abdomen .04. Cornicle slightly swollen just proximad to reticulation. Cauda rather broad and short, tapering or nearly parallel-sided with blunt tip, bearing 5 pairs of lateral and 2-3 pairs of dorsolateral hairs and about 3 single dorsal ones.

Alate Vivipara. (Mounted on slide), head and thorax dark; otherwise as in apterous vivipara except as shown in figure, and hairs slightly shorter.

Ovipara. Apterous. (Mounted in balsam), dark markings same as in apterous vivipara. Body length 3-3.4; hind tibia 3.2 with proximal half or third very slightly swollen and bearing numerous sensoria; antenna 5.2, III 1.0 with 4-6 sensoria, IV .95-1, V 1, VI .33+.77; cornicle 1.3-1.4; cauda .25 on median line.

Male. Alate (Mounted in balsam), dark markings same as in alate vivipara. Body length 3; hind tibia 2.5; antenna 4+ (broken in all specimens); cornicle .80-.85, reticulated area .12-.15 long; cauda .15 on median line.

Collections. On leaves and stems of *Sambucus pubens.* Colorado: Bear Lake (in Rocky Mountain National Park), Cameron Pass and Pingree Park. Generally in northern Utah. Apterous summer viviparae June 4 to Aug. 28, alate viviparae Aug. 22, sexuales Aug. 22 (at 9000 alt.); rare.

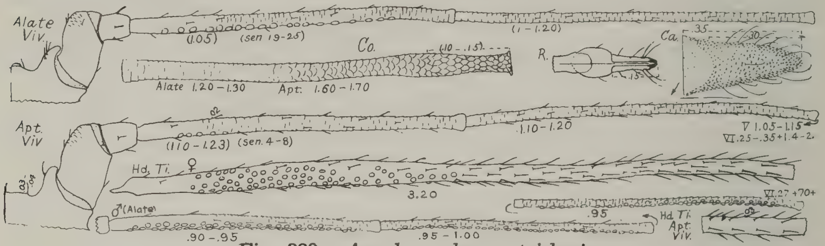

Fig. 289. *Amphorophora stanleyi*

Chief Distinguishing Characters. Pale yellow or green immaculate body color with pale appendages, long antenna (much longer than body, with IV and V each about the same length as III or even slightly longer and base of VI about twice as long as hind tarsal II), relatively few sensoria, located along posterior margin, in both viviparae and sexuales, short cauda (about the same length as base of VI), presence of reticulation on cornicle (area .16 long) and length of hind tarsal II (the same as that of rostral IV+V).

Amphorophora tigwatensa Hottes

Amphorophora tigwatensa **Hottes, 1933:11; Gillette and Palmer, 1934:142.**

Apterous Summer Vivipara. Color similar to alate vivipara. Body length 2.85; across eyes .57-.59; hind tibia 2.9; antenna 3.9-4.8; rostrum attaining nearly to 3d coxa. Hairs slightly capitate. Cauda tapering with slight suggestion of neck, bearing 4-5 pairs of lateral hairs. Cornicle moderately swollen on distal half, about twice width of narrowest portion.

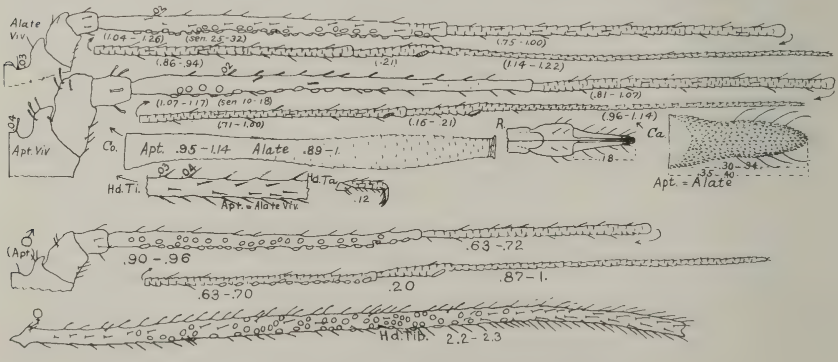

Fig. 290. *Amphorophora tigwatensa*

Alate Vivipara. Head and thorax yellow-brown; abdomen green or pink, with dusky lateral areas; antenna dusky except base of III; rostrum tibiae and cornicle dark brown; cauda pale; veins of wings bordered. Body length 2.78; across eyes .61; rostrum attaining 2d coxa. Hairs blunt; on side of abdomen .015-.02. Otherwise as in apterous summer vivipara.

Ovipara. Apterous. Color same as in apterous summer vivipara but measurements ranging somewhat smaller and hind tibia, though hardly swollen covered for nearly entire length with rather large scattered sensoria.

Male. Apterous. Head brown; abdominal segments with short dorsal dashes and lateral areas dark; otherwise same as apterous vivipara. Body length 1.5-2; across eyes .50; antenna about 4; hind tibia 2.20-2.30; cornicle .60; rostral IV+V .15-.17, attaining 3d coxa; cauda .15-.20 on median line, .25 entire length.

Collections. On *Rubus* sp., on undersides of leaves and on tender stems. Colorado: Grand Mesa, Cameron Pass and Eldora. Apterous and alate summer viviparae June 25 to Aug. 21; rare.

Type. U.S.N.M. Paratypes, Hottes and Colo. Agr. Exp. Sta. Collections.

Chief Distinguishing Characters. Slender cornicle with narrowest part hardly wider than base of III and widest part hardly twice narrowest part, dark color and absence of reticulation on cornicle, rather long rostral IV+V (.18), number of hairs on cauda (4-5 lateral pairs) and presence of sensoria on III of apterous vivipara.

This species differs from *A. rubi* in the dark cornicle and antenna, the longer rostral IV+V (.18-.19 not .14-.15). This species may seem to be a synonym of *A. amurensis* (Mordvilko), appearing to differ only in smaller size (length less than 3) and the absence of swelling next to flange on the cornicle. However, Mordvilko in correspondence with Hottes declared *tigwatensa* "doubtless new and unlike any species on *Rubus* which he knew."

Amphorophora urtica Essig

Amphorophora urtica Essig, 1942:14.
Amphorophora alleni Knowlton and Fronk, 1942a:113 (new synonymy).

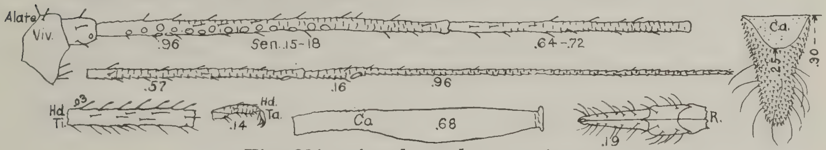

Fig. 291. *Amphorophora urtica*

Alate Vivipara. (Cleared and mounted on slide), body colorless with dusky lateral areas on all abdominal segments, inconspicuous on I and VIII and small dorsolateral spots on posterior margin of III, IV and V; head and thorax dark; entire antenna, except base of III lighter, cornicle, cauda, rostrum and tibiae dusky; tarsi and tips of tibiae dark. Body length about 3; antenna about 3.50; hind tibia 2.40-2.75; rostrum attaining 3d coxa. Hairs blunt to slightly capitate; on side of abdomen .02-.025 long; moderately numerous on abdomen. Cauda tapering, broad and blunt, bearing 4-7 hairs on each side and 2 dorsal ones.

Collections. On grass (probably accidental)*. Utah: Lincoln. Alate viviparae June 2.

Type and Paratypes. Essig Collection (Bartholomew Collection); type of *alleni*, Knowlton Collection.

Chief Distinguishing Characters. Long rostral IV+V (.10), hairiness of rostral IV+V and of cauda, absence of reticulation on cornicle, length of cornicle (about equal to IV and shorter than III) and number of sensoria on III (about 15-18).

Amphorophora utahensis Knowlton and Allen

Amphorophora utahensis Knowlton and Allen, 1945a:114.

Alate Vivipara. "Green." (Mounted on slide), pale with the following parts more or less dusky: Head, thorax, antenna (especially I, II and III), tarsi, cornicle and tips of tibiae and of rostrum. Body length "1.53"-1.80-2; across eyes .50-.55; antenna about 3; hind tibia 2-2.8; rostrum attaining to about abdominal III. Cauda with slight neck then nearly parallel-sided, bearing 3 pairs of lateral hairs and 2 dorsal ones. Cornicle moderately swollen, smooth with reticulations composed of closed imbrications at tip.

*Essig described this species from numerous examples both alate and apterous viviparae taken on *Urtica gracilis* var. *holoserica*.

Collections. On *Rubus parviflora.* Utah: Ogden. Alate vivipara June 4; rare.

Chief Distinguishing Characters. Length of antenna (4), absence of sensoria on IV and V of alate vivipara, length of cornicle (about .60, not distinctly shorter than III or unguis), shape of cornicle (moderately swollen), sculpture of cornicle and length of rostrum (attaining abdominal III).

From *A. davidsoni* Mason it differs only in the shorter area of reticulation on the cornicle (.05 instead of .09).

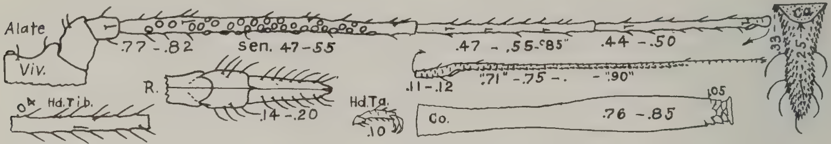

Fig. 292. *Amphorophora utahensis*

Genus **Artemisaphis** Knowlton

Knowlton and Roberts, 1947c:27.

Characters. Frontal tubercles not or only slightly exceeding vertex; antennal I thickened and somewhat gibbous; secondary sensoria round. Cornicle cylindrical to tapering and reticulated at tip. Cauda narrow, tapering, not twisted or crenate, with 2 lateral pairs of long hairs near base and another pair near tip. Anal plate with ventral, median, wartlike protuberance. Fore wing with media twice-branched; hind wing with both cross-veins.

Genotype (monotypical), *Aphis artemisicola* Williams.

This genus is distinguished from *Bipersona* Hottes, which it closely resembles, by the shape of the cauda which is not crenated so as to give twisted appearance and by the shape of the frontal tubercles which are not markedly exceeding vertex.

Artemisaphis artemisicola (Williams)

Aphis artemisicola **Williams, 1910:37; Davis, 1911b:8; Gillette and Palmer, 1928:14 and 1932b:381.**

Apterous Summer Vivipara. **Reddish vinaceous black, shining; appendages brownish to blackish; cornicle black; cauda brown. Body length 2, robust; antenna 1.75; hind tibia 1-1.1; rostral IV+V tapering, attaining between 2d and 3d coxae, tip beyond hairs needlelike in ventral view, resembling a distinct segment V.**

Alate Vivipara. **Color same as apterous vivipara. Body length 2; antenna 2-2.50, secondary sensoria tuberculate; other measurements as in aptera. Hairs pointed; on body .05 long, fine and sparse. Cornicle with 1-3 fine hairs usually evident, cauda bearing 2-3 pairs of curved hairs and sometimes one dorsomedian, heavy, blunt, spinelike hair evident. Anal plate with median wartlike protuberance, projecting ventrally not posteriorly.**

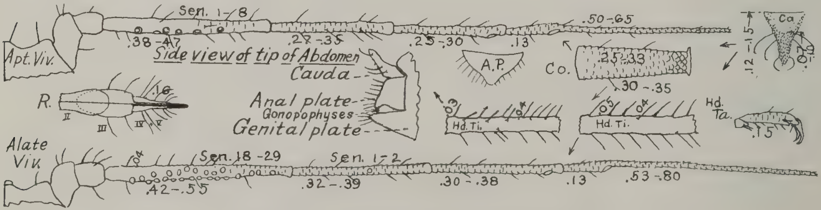

Fig. 293. *Artemisaphis artemisicola*

Collections. On leaves and stems of *Artemisia aromatica, A. cana, A. longifolia,* and *A. tridentata.* Throughout region. Apterous summer viviparae June 22 to Aug. 22, alate viviparae July 11; very abundant on infested plants.

Cotypes. U.S.N.M., No. 56 and Univ. of Neb. Collection, No. 53.

The Rocky Mountain examples differ from the type specimens in that they fall in the lower range of variation in sensoria and somewhat below the measurements for the antenna in the aptera but the measurements of the alata agree with the description.

Genus **Bipersona** Hottes

Hottes, 1926:115; Gillette and Palmer, 1934:143.

Characters. Vertex distinctly convex; frontal tubercles well developed and diverging, exceeding vertex. Antenna six-segmented; secondary sensoria circular. Cornicle cylindrical, reticulated. Cauda with broad proximal portion and with portion beyond body slender, crenated, appearing as though twisted; anal plate produced ventroposteriorly, resembling a cauda. Hairs pointed. Lateral tubercles present. Fore wing with media twice-branched; hind wing with both media and cubitus. Rostrum with V indistinct. Living on leaves and stems of herbaceous plants.

Genotype (monotypical), *Aphis torticauda* Gillette.

Chief Distinguishing Characters. Peculiar shape of the cauda, cylindrical reticulated cornicle and moderately developed frontal tubercles.

Key to Species of Bipersona

1. Unguis shorter than III (p. 247) .... *torticauda*
.... Unguis not shorter than III (p. 247) .... *ochrocentri*

Bipersona ochrocentri (Cockerell) n. comb.

Aphis ochrocentri Cockerell, 1903d:248.

Apterous Vivipara. Head, thorax and most of underparts pale pink; abdomen brownish plumbeous; delicately pruinose, more or less shining on disc; abdominal VII and VIII pale green; apical half of appendages and cornicle black. Body length 3; stout, pyriform; antenna failing to reach cornicle by half of cornicle length; cornicle more than twice length of cauda; cauda about as long as hind tarsal II; rostrum considerably surpassing hind coxa. *Young.* Pink.

Alate Vivipara. Similar to apterous vivipara but darker; bases of wings delicate green. Antenna shorter than body, III .60, IV .38, V .36, VI .15+.66, secondary sensoria on III extremely prominent, 25 or more, on IV about 6; rostrum attaining abdomen, about 1.40 long, its terminal segment .35; cauda about .20, slender; "cornicle rugose-tessellate" .50 long, .06 in diameter, not swollen in middle; hind tarsal II .23.

Collections. On *Carduus ochrocentrus.* New Mexico: Pecos. Colorado: Probably Custer County (Cockerell, 1893:366). Alate and apterous viviparae July 13; one collection but abundant on that occasion.

Above description and records are rearranged from original description by Cockerell, since type specimens are, at present, unavailable.

Genotype *Bipersona torticauda* (Gillette)

The Red Thistle Aphid

Aphis torticauda Gillette, 1907:389-391.
Aphis cnici Williams, 1910:40, (preoccupied); Davis, 1911b:12.
Bipersona torticauda, Gillette and Palmer, 1934:143.

Fundatrix. Yellowish brick-red, lighter anteriorly; not pruinose; appendages, cornicle, cauda and anal plate black. Body length 2.50; hind tibia 1; antenna 1.60; cornicle .43-.45; otherwise as in summer vivipara.

Apterous Summer Vivipara. Young Nymph. Pale yellow, mottled with coral-red. *Adult.* Brick-red to red-ochre; naked; appendages and cornicle black; cauda and anal plate reddish to dusky distally. Body length 3.2-3.75; hind tibia 1.9-2; hind tarsal II .17-.20; antenna 2-3; rostrum acute, attaining abdominal I or II.

Alate Vivipara. Brick-red to ochre-red; naked; thoracic lobes brownish; all appendages dusky to black; wings hyaline. Body length 2.1 and slender to 3.40 and robust; hind tibia 1.60-1.90; hind tarsal II .15-.17; antenna 2.10-2.50. Hairs spinelike; on appendages and body about .03 long, semierect and moderately numerous; on cauda .05-.07 long, straight to curved or slightly wavy. Cauda* slender, appearing twisted or corkscrew-shaped, bearing about 4 hairs on each side. Anal plate with median caudalike, stout, nearly cylindrical, broadly rounded protuberance bearing curved hairs. Lateral tubercles present on prothorax and abdominal I to VII.

*Male. Apterous.*** Yellowish to reddish brown to greenish rufous; with all appendages dark. Body length 1.60-1.75; hind tibia 1.30; antenna 1.60; cornicle .17.

Ovipara. Apterous. Color same as in apterous summer vivipara. Body length 2.50; hind tibia 1.35; antenna 1.80; cornicle .40; hind tibia somewhat swollen and bearing a few scattered, small sensoria.

Egg. Newly laid, light green; later, polished black.

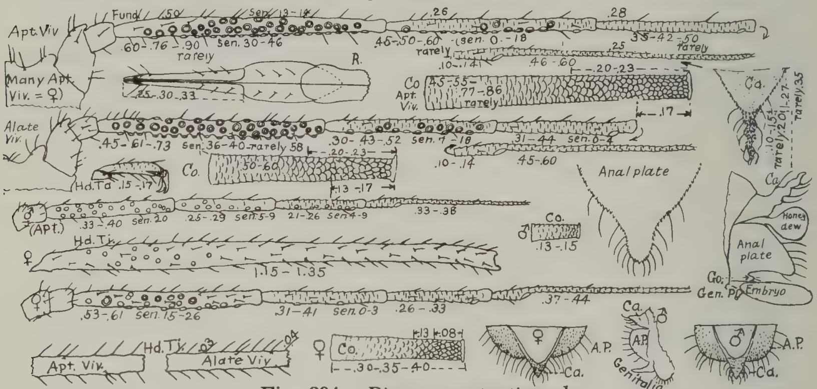

Fig. 294. *Bipersona torticauda*

Collections. On leaves and stems of *Cirsium* sp. Throughout Colorado and Utah. Fundatrices May 13 to 22, apterous summer viviparae May 22 to Oct. 27, alate viviparae May 30 to July 29, sexuales Sept. 27 to Oct. 18; found in large numbers, common.

Types. U.S.N.M., No. 42817. Paratypes, Colo. Agr. Exp. Sta. Collection.

This species seems very close to *Aphis ochrocentri,* judging from the original description, but Gillette after examining type specimens considered the species as distinct but recorded no detailed comparison. At present the types seem to be unavailable so the writer is unable to make a study of them and the species are being held distinct mainly following opinion of Gillette together with the following differences as compared with the original description: Body not "brownish plumbeous and pruinose," III longer than unguis not shorter and number of sensoria on III of alate vivipara not fewer than 36, on IV 7-18.

Genus **Capitophorus** van der Goot

Van der Goot, 1913:84.

Characters. Vertex convex; frontal tubercles distinctly developed, exceeding vertex. Antenna six-segmented, with circular sensoria, I somewhat gibbous. Hairs on body capitate, globate to funnel-shaped. Cornicle elongate, slender, cylindrical or slightly clavate. Cauda tapering to parallel-sided or spoon-shaped. Lateral tubercles usually absent. Ocular tubercle inconspicuous. Fore wing with media twice forked; hind wing with both media and cubitus. Living exposed on leaves and twigs of deciduous plants.

Genotype (fixed by van der Goot, 1913:145) *Aphis carduina* Walker.

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*Some aphidologists have interpreted this peculiar cauda as a dorsal tubercle and the protruding anal plate as the cauda. Examination of specimens in side view should verify Gillette's interpretation. Especially convincing is the study of live specimens, in which case honeydew is seen to emerge just ventrad to the corkscrew-shaped structure and on pressure, embryos appear ventrad to the broader projection on the ventral edge of which are the gonopophyses.

**Alate males mentioned by Gillette in original description proved to be only shrivelled viviparae.

Key to Species of Capitophorus

1. Cornicle cylindrical, flange not oblique 2
.... Cornicle clavate, more or less, at least flange oblique 19
2. Hairs on II and base of III in aptera globate at tip 3
.... Hairs on II not globate at tip 4
3. Hairs on II and base of III conspicuous (p. 256) .... *fragaefolii*
.... Hairs on II and base of III not conspicuous (p. 253) .... *cefsmithi*
4. Cornicle shorter than cauda 5
.... Cornicle subequal or equal to cauda 7
.... Cornicle longer than cauda 8
5. III longer than .50 (p. 252) .... *brevinectarius*
.... III shorter than .50 6
6. Hind tibia .70 or longer; cornicle .09-.10 (p. 255) .... *filifoliae*
.... Hind tibia as above; cornicle .13 or more (p. 271) .... *spatulavillus*
.... Hind tibia shorter than .70 (p. 266) .... *infrequens*
7. III not longer than .25 (p. 251) .... *bitrichus*
.... III longer than .25 but shorter than .50 (p. 271) .... *spatulavillus*
.... III .50 or longer (p. 250) .... *acanthovillus*
8. Rostrum with long needlelike tip resembling distinct V 9
.... Rostrum without long needlelike tip 12
9. Color green; appendages pale 10
.... Color brown; appendages dark 11
10. Body hairs on dorsum all capitate (p. 257) .... *gnaphalodes*
.... Body hairs on dorsum capitate and simple (p. 259) .... *heterohirsutus*
11. Unguis 3-4 times as long as base of VI. Body longer than 1.50 (p. 266) .... *pullus*
.... Unguis 4-5 times as long as base of VI. Body not longer than 1.50 (p. 269) .... *rusticatus*
12. Rostral IV+V not longer than base of VI 13
.... Rostral IV+V longer than base of VI 16
13. Hairs on body not funnel-shaped; rostrum obtuse (p. 263) .... *minor*
.... Hairs funnel-shaped; rostrum either obtuse or acute 14
14. Rostrum with acute tip 15
.... Rostrum with obtuse tip 18
15. Cauda with 4 dorsal hairs, some of them in aptera fingerlike to funnel-shaped (p. 263) .... *oestlundi*
.... Cauda with only a single dorsal simple hair (p. 272) .... *wasatchii*
16. Cauda shorter than twice length of base of VI 17
.... Cauda longer than twice length of base of VI (p. 253) .... *cefsmithi*
17. Antenna in alata with about 50 sensoria on III, 33-40 on IV, 8-14 on V and unguis 8 times as long as base of VI (p. 251) .... *braggii*
.... Antenna in alata with 20-30 sensoria on III, 13-18 on IV, 0-3 on V; unguis 4-6 times as long as base of VI (p. 253) .... *carduinus*
18. Cornicle shorter than IV and 5 times as long as rostral IV+V (p. 255) .... *feragaeus*
.... Cornicle not shorter than IV and 6-7 times as long as rostral IV+V (p. 267) .. *pycnorhysus*
19. Cauda with fewer than 3 pairs of lateral hairs 20
.... Cauda with 3 or more pairs of lateral hairs 36
.... Cauda with 2-3 pairs of lateral hairs (p. 266) .... *pullus*
20. Hairs on vertex without shaft 21
.... Hairs on vertex with slender shaft 27
21. Unguis not longer than III (p. 272) .... *utensis*
.... Unguis longer than III 22
22. Cornicle about equal to or longer than V, especially in aptera 23
.... Cornicle shorter than V 24
23. Cornicle in aptera .70 or longer, about as long as unguis (p. 261) .... *longinectarius*
.... Cornicle in aptera .50-.70, shorter than unguis (p. 267) .... *pycnorhysus*
.... Cornicle in aptera shorter than .50, shorter than unguis (p. 254) .... *decampus*
24. Rostrum with needlelike tip (p. 274) .... *zoomontanus*
.... Rostrum not with needlelike tip 25
25. Cornicle not longer than .40, shorter than distance across eyes (p. 262) .... *magnautensis*
.... Cornicle longer than .40, not shorter than across eyes 26
26. III longer than .70; body hairs numerous (p. 254) .... *elongatus*
.... III same; body hairs very numerous (p. 265) .... *palmerae*
.... III not longer than .70 (p. 255) .... *feragaeus*

27. Unguis not longer than 4 times length of base of VI........28
.... Unguis longer than 4 times length of base of VI........31
28. Antenna in aptera five-segmented (p. 270)........*shepherdiae*
.... Antenna in aptera six-segmented........29
29. Unguis shorter than cornicle (p. 273)........*xanthii*
.... Unguis longer than cornicle........30
30. Cornicle about same length as IV and distance across eyes........43
.... Cornicle shorter than IV and about equal to half of distance across eyes (p. 271)........*spatulavillus*
.... Cornicle shorter than IV, third or less distance across eyes (p. 260)........*infrequens*
31. Rostrum not with needlelike tip (p. 250)........*acanthovillus*
.... Rostrum with needlelike tip........32
32. Unguis not shorter than 1.5 times III (p. 265)........*pseudoglandulosus*
.... Unguis shorter than 1.5 times III........33
33. Cornicle longer than .60 (p. 261)........*longipes*
.... Cornicle not longer than .60........34
34. Rostrum with needlelike tip; cornicle not longer than .50. On *Artemisia* (p. 265)........*pseudoglandulosus*
.... Rostrum with acute tip but not needlelike; cornicle longer than .50. On *Chrysothamnus*........35
35. Hairs on vertex infundibulate, sessile; body hairs not very numerous (p. 254)........*elongatus*
.... Hairs on vertex as above; on body very numerous (p. 265)........*palmerae*
36. Body hairs stalked........37
.... Body hairs sessile........39
37. Hairs on I and II conspicuous (p. 263)........*ribis*
.... Hairs on I and II inconspicuous........38
38. Cauda with 4-5 pairs of lateral hairs; unguis twice as long as III; sensoria 20-30 on III of alata (p. 259)........*hippophaes*
.... Cauda with 2-3 pairs of lateral hairs; unguis shorter than twice length of III (p. 250)........*acanthovillus*
39. Hairs on vertex sessile-infundibulate, especially in apterae........40
.... Hairs on vertex infundibulate with stalk or fingerlike........42
.... Hairs on vertex slenderly globate (p. 271)........*sporadicus*
40. Cauda with 2-3 broadened hairs on dorsum (p. 263)........*oestlundi*
.... Cauda not with 2-3 broadened hairs on dorsum........41
41. Body brown; cornicle black (p. 258)........*gregarius*
.... Body green; cornicle pale to dusky (p. 274)........*xerozoous*
42. Cauda broadly tapering, .13-.15 long on median line (p. 254)........*decampus*
.... Cauda slenderly tapering to spatulate, .17-.25 long on median line (p. 268)........*quadritrichus*

Capitophorus acanthovillus Knowlton and Smith

Capitophorus acanthovillus **Knowlton and Smith, 1936c:108.**

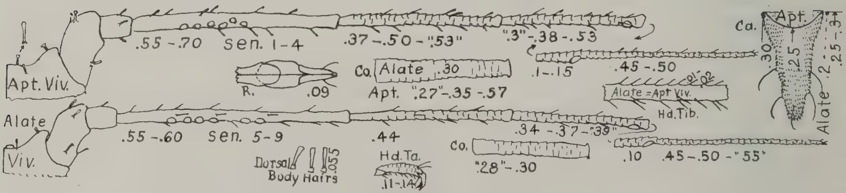

Fig. 295. *Capitophorus acanthovillus*

Apterous Summer Vivipara. "Green." (Mounted on slide), body immaculate with cauda and tibiae pale; antenna beyond base of III dusky; tarsi, cornicle, tips of tibiae and extreme tip of rostrum black. Body length 1.60-1.90; across eyes .48-.50; antenna about 2; hind tibia 1-1.10-"1.28"; rostrum attaining 2d coxa. Cauda tapering, rather stout, bearing 2 pairs of lateral hairs and one dorsal preapical one. Cornicle slightly clavate to practically cylindrical, imbricated.

Alate Vivipara. Same in color as aptera or with dusky portions darker. Body length 1.40; across eyes .44; antenna about 2; hind tibia 1.05-1.09; rostrum as in aptera, tip obtuse. Hairs on vertex and body narrow-infundibulate or fingerlike to blunt or sometimes slightly globate; sparse.

Collections. On *Chrysothamnus viscidiflorus* and on *Gutierrezia* sp. Utah: Holmes Creek, Cedar Springs and Curlew Valley. Alate and apterous viviparae June 9 and "viviparae" July 5; rather rare.

Type. Knowlton Collection. Paratypes, Knowlton and Colo. Agr. Exp. Sta. Collections.

This species is on the border line between *Macrosiphum* and *Capitophorus* but is placed in the latter genus on account of the presence on the vertex of fingerlike or narrowly infundibulate hairs, though globate to blunt hairs as in the former genus also occur.

Chief Distinguishing Characters. Length of antenna (1.25 times as long as body), shape of the hairs (mostly fingerlike on vertex and body), absence of fingerlike hair on dorsum of cauda, length of cornicle (3-6 times as long as rostral IV+V).

Capitophorus bitrichus Knowlton and Smith

Capitophorus bitrichus Knowlton and Smith, 1936e:230.

Apterous Summer Vivipara. (Mounted on slide), body immaculate; antenna, beginning with tip of V, cornicle, tarsi, rostral III and IV+V and tips of tibiae dusky; cauda, cornicle and anal plate pale to slightly dusky. Body length 1-1.28; across eyes .31-.35; antenna .95-1.15; hind tibia .47-.55; rostrum with needlelike tip, attaining 3d coxa. Hairs on vertex mostly broadened, but a few pointed, especially toward ventral aspect and with short sessile funnel-shaped ones dorsally; on body numerous and same as on dorsum of head; on antenna pointed and sparse; on hind tibia pointed and fairly numerous. Cornicle cylindrical. Cauda slender and tapering, bearing 2 pairs of lateral hairs.

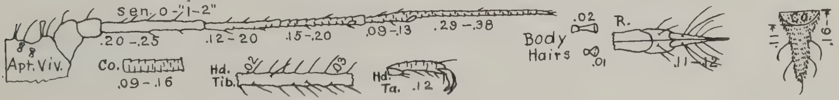

Fig. 296. *Capitophorus bitrichus*

Collections. On *Artemisia tridentata,* leaves and stems. Utah: Bear and Sardine Canyons, Hyrum and Lewiston. Apterous viviparae Aug. 4 to 23; apparently quite rare.

Type and Paratype. Knowlton Collection.

Chief Distinguishing Characters. Variation of hairs on the head of apterous vivipara, shortness of the cornicle (about the same length as base of VI), small cauda (on median line same length as base of VI), small size of body (length less than 1.30) and short antenna (shorter than 1.2, III not longer than .25).

Capitophorus braggii (Gillette)

The Oleaster Thistle Aphid

Myzus braggii Gillette, 1908:17 and 1915b:375.
Capitophorus flaveolus (Walker), Hottes and Frison, 1931a:282 (disputed synonymy).
Capitophorus braggii, van der Goot, 1915:119; Gillette and Palmer, 1934:146.

On *Cirsium arvense* and *Cynara* sp. as summer hosts:

Apterous Summer Vivipara. Pale greenish yellow to flesh-colored with greenish vittae; appendages, cornicle and cauda pale. Body length 1.9; hind tibia 1.25; cornicle .70-.90; antenna 2.33-2.7; rostrum attaining 2d or 3d coxa. Hairs capitate or globate; .06-.07 on vertex; slightly shorter on body and sparse; .01, merely blunt and sparse on antenna and hind tibia.

Alate Vivipara. Head and thorax black or blackish; abdomen light yellow to greenish, with dark lateral areas and a dark green dorsal patch on III to VI. Other characters as in aptera except as figured.

Male. Alate. Color as in alate vivipara except that on abdomen the dorsal patch is broken into short bands which are present on all segments posterior to II. Body length 1.50-1.80; antenna 2.10-2.30.

Collections. On leaves and stems of *Cirsium arvense* and *Cynara scolymus* and *C. cardunculus.* Colorado: Fort Collins and Denver. Apterous summer viviparae Aug. 21 to Oct. 6, alate viviparae May 22 and Sept. 24 to Nov. 8, oviparae (very few) and eggs Oct. 5 to 26, males Oct. 20 to 26; not common but rather abundant where occurring.

On *Elaeagnus augustifolia*, as winter host:

Fundatrix. Newly Hatched. Very light yellowish green with a pair of dorsolateral rows of dusky spots; cornicle often slightly dusky; head dusky with light median line. Body length .50-.55; cornicle .05-.07. ***Adult.*** Pale yellowish green with transverse mottling of darker green, forming a pair of dorsolateral vittae. Entire dorsum shagreened. Appendages, cornicle and cauda pale, with tarsi and tips of cornicle and antenna dusky. Body length 2; antenna 1.35; cornicle .55-.65; cauda .15 on median line, .18-.20 on side. Hairs on body capitate; simple, sparse and short on appendages.

Alate Vivipara. Distinguished from the above described alate form on thistle as follows: Antenna 2-2.43, sensoria 36-40 on III, 19-30 on IV, 9-13 on V, and cornicle is longer than III instead of about equal.

Apterous Summer Vivipara. Same as apterous vivipara on thistle.

Ovipara. Color similar to apterous vivipara. Body length 1.70; cauda .15 on median line, .20 on side; hind tibia .70, slightly swollen in middle half and thickly covered with small

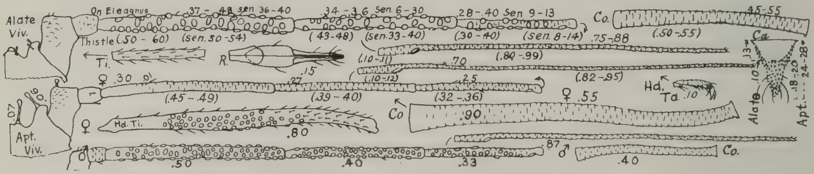

Fig. 297. *Capitophorus braggii*

Collections. On leaves and stems of *Eleagnus angustifolia, Hippophaes rhamnoides* and *Shepherdia argentea*. Colorado: Fort Collins. Utah: Logan. Fundatrices March 9 to May 4, apterous summer viviparae May 1 to 11 and Oct. 31, alate viviparae March 17 to June 2 and Sept. 16 to Oct. 9, oviparae Oct. 12 to 21, males (migrated from summer hosts) Oct. 14 to 31.

Type. U.S.N.M., No. 41946. Paratypes, Colo. Agr. Exp. Sta. Collection.

Our specimens differ from *C. carduinus* in longer antenna and more numerous sensoria; the form on *Eleagnus* grading closest and the form on *Cirsium* differing most.

C. braggii has been declared synonymous with *C. flaveolus* (Walker) by Hottes and Frison (op. cit.), following determination by Theobald of specimens sent him. Theobald gives *C. carduinus* as a synonym of *C. flaveolus* (Walker). Van der Goot (1915:119) considers *C. braggii* as distinct from *C. carduinus* and specimens sent to us by him support his statements. Theobald's description (1926:250) of *C. flaveolus* appears to agree with above-mentioned specimens from van der Goot. Possibly all belong to one very variable species but the subject appears to need further study, especially more information as to the range of variation in Walker species. So for the present, we retain *C. braggii* for the American form.

Chief Distinguishing Characters. Cylindrical, though curved cornicle, slender, acute, moderately long (.15) rostral IV+V, short cauda in alate vivipara (.10 on median line shorter than rostral IV+V), presence of sensoria on III, IV and V in alate vivipara, tuberculate shape of the sensoria and long cornicle (as long as III in alate vivipara and nearly twice as long in apterous vivipara).

Capitophorus brevinectarius Gillette and Palmer

Capitophorus brevinectarius Gillette and Palmer, 1933:350 and 1934:147.

Apterous Summer Vivipara. Medium green, appearing frosted due to funnel-shaped hairs; cauda pale to slightly dusky; cornicle and appendages blackish except femora pale to brown. Body length 1.95-2.20; otherwise as in alate vivipara.

Alate Vivipara. Head and thorax brown; color otherwise as in aptera. Venation of wings rather heavy and brown and slightly bordered. Body length 1.5-1.8; across eyes .42-.45; hind tibia 1.20-1.30; antenna 2.75-3; cornicle width the same as hind tibia; rostrum with needlelike tip .06 long, attaining 2d coxa. Hairs on vertex funnel-shaped with slender shaft; on antenna blunt, drooping and sparse; on hind tibia, pointed; on side of body funnel-shaped, without stalk, .02 long and numerous. Lateral tubercles absent. Cornicle cylindrical, without distinct flange. Cauda nearly parallel-sided.

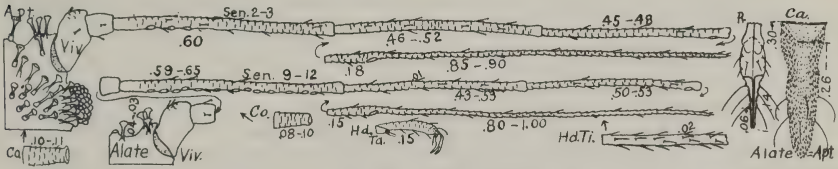

Fig. 298. *Capitophorus brevinectarius*

Collections. On leaves and twigs of *Artemisia longifolia.* Colorado: Elk Springs. Wyoming: Chimney Rock (near Jelm). Apterous and alate summer viviparae June 26, apterae till Aug. 9; rare, but found in large colonies where occurring. Quite agile when disturbed.

Type. U.S.N.M., No. 49294. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Extreme shortness of the cornicle (shorter than hind tarsal II and hardly equaling third length of cauda), and funnel-shaped hairs on body.

[Genotype *Capitophorus carduinus* (Walker)]

***Aphis carduina* Walker,** 1850:44.
Capitophorus carduinus, van der Goot, 1915:115.
Capitophorus flaveolus (Walker), Theobald, 1926:250.

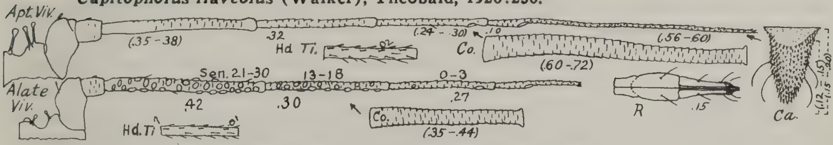

Fig. 299. *Capitophorus carduinus*

Summer Vivipara. Pale green to transparent white; appendages pale. Body length 1-2; hind tibia .92-1; hind tarsal II .10; antenna 2.08; rostrum attaining between 2d and 3d coxae. Hairs capitate; on vertex with globate tips, .06 long in aptera, .02 in alata; on antenna and hind tibia .02 and sparse; on body in aptera globate and .04 long. Fore wing with media twice-forked; hind wing with both cubitus and media.

Hosts. Leaves and stems of *Carduus* sp. (Not recorded from region.)

Data for above description and figures were taken from Theobald (op. cit.) and van der Goot (op. cit.) and from specimens determined by the latter.

Capitophorus cefsmithi Knowlton

Capitophorus cefsmithi Knowlton, 1940a:196.

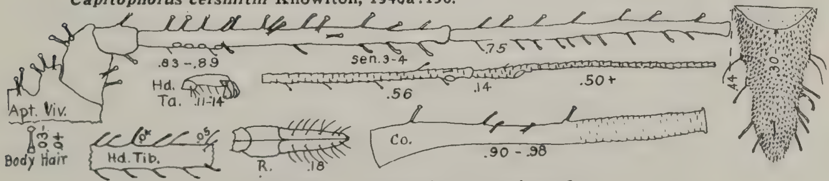

Fig. 300. *Capitophorus cefsmithi*

Apterous Summer Vivipara. (Mounted on slide), body colorless; antenna beyond middle of III, tarsi and tips of tibiae dusky; cauda and rostrum pale to dusky; cornicle pale. Body length 3-"3.2"; across eyes .60; antenna over 3; hind tibia 2.55; rostrum attaining beyond 2d coxa. Hairs globate on vertex, body, antenna and cornicle; slightly capitate on legs and blunt on cauda. Cornicle slightly clavate, lightly imbricated and bearing about 5 capitate hairs.

Collections. On wild geranium (*Geranium* sp.). Colorado: Mesa Lake. Utah: Logan Canyon. Apterous viviparae May 31 and July 15; rare.

Type. Knowlton Collection.

Chief Distinguishing Characters. Character of the hairs (globate or capitate throughout, even on the cornicle and blunt to capitate on the cauda) and rather long and broad rostral IV+V.

Capitophorus decampus Knowlton and Smith

Capitophorus decampus **Knowlton and Smith, 1936e:230.**

Apterous Vivipara. "Bluish green to apple-green with whitish cast" due to numerous funnel-shaped hairs; appendages pale except tarsi, tips of tibiae, of rostrum and antenna beyond middle of V which are blackish. Body length "1"-1.4-1.6; across eyes .37-.40; antenna 1.75-1.90; hind tibia .62-.75; rostrum with needlelike tip, attaining between 2d and 3d coxae. Hairs on vertex slender, funnel-shaped with stalk; on occiput the same but becoming sessile; on antennal I and II short and inconspicuous, blunt to slightly enlarged at tip, reclinate; on III blunt, .01 long, reclinate and sparse; on body funnel-shaped with slight stalk to sessile; on hind tibia, on proximal half, reclinate, blunt and .01 long, on distal half semi-erect, nearly pointed .02 long. Cornicle slender, with tendency to clavate shape. Cauda tapering, bearing 2 pairs of lateral hairs and a single dorsal preapical one.

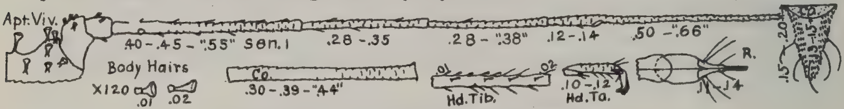

Fig. 301. *Capitophorus decampus*

Collections. On *Artemisia tridentata* and *A. vulgaris.* Utah: Blacksmith Fork Canyon, Brigham, Collinston, Honeyville, Logan and Emery. Apterous summer viviparae April 28 to Oct. 12.

Type and Paratypes. Knowlton Collection. Paratypes, also Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Pale green body and appendages, relatively short unguis (not greatly exceeding III and shorter than 6 times base of VI), rather short cornicle (shorter than III and about the same as IV), approximately clavate shape of cornicle, needlelike tip of the rostrum, length of III (exceeding that of IV) and length of V (equalling or exceeding IV).

Capitophorus elongatus Knowlton

Capitophorus elongatus **Knowlton, 1929b:11; Knowlton, 1935b:283; Gillette and Palmer, 1934:148; Knowlton and Smith, 1936c:109; Gillette and Palmer, 1936b:747.**

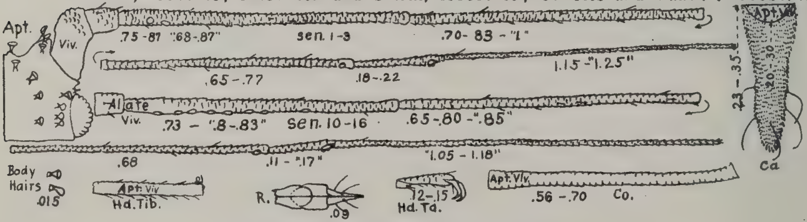

Fig. 302. *Capitophorus elongatus*

Apterous Summer Vivipara. "Shining apple-green." (Mounted on slide), body pale and immaculate; cauda, cornicle, tibiae and antennal I and II and base of III pale; antenna beyond base of III, tarsi and tips of tibiae and of rostrum dusky. Body 2-"2.6-2.85"; antenna about 4; hind tibia 1.25-1.80; rostrum attaining 2d coxa. Cauda tapering to nearly parallel-sided, bearing 2 pairs of lateral hairs and a single dorsal preapical one. Cornicle slender, hardly clavate but with flange set obliquely. Body hairs infundibulate and numerous.

Alate Vivipara. About the same in color and measurements as aptera except rostrum hardly attaining 2d coxa.

Collections. On *Chrysothamnus parryi, C naueosus* subsp. *nauseosus* and *C. viscidiflorus.* Colorado: Lindland. Utah: Throughout state. Alate viviparae June 26 to 28, apterous viviparae May 2 to Sept. 16; rather common.

Cotypes. U.S.N.M. and Utah and Colo. Agr. Exp. Sta. and Knowlton Collections.

Chief Distinguishing Characters. Long, pale, clavate cornicle, long cauda bearing not more than two pairs of lateral hairs, length of IV (coequal with or exceeding III), sessile, infundibulate hairs on vertex of aptera and only moderately numerous body hairs.

Capitophorus feragaeus Knowlton and Smith

Capitophorus feragaeus Knowlton and Smith, 1936:110; Palmer, 1936b:742.

Apterous Vivipara. Body pale; tarsi, tips o ftibiae and antenna beyond middle of III black; cornicle, cauda and tibiae pale. Body length 1.8-"2"; antenna 3.2; hind tibia 1.05-1.10; rostrum acute but not with needlelike tip in ventral aspect, attaining or surpassing 2d coxa. Hairs on vertex and body funnel-shaped, .015-.02 long; on antenna and hind tibia blunt to pointed, .01 long and sparse. Cornicle slightly clavate; cauda rather slender and spatulate, bearing 2 pairs of lateral hairs and a single dorsal preapical one.

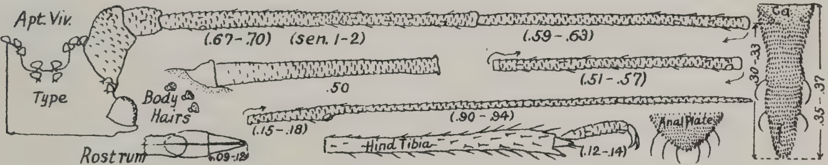

Fig. 303. *Capitophorus feragaeus*

Collections. On leaves and stems of *Chrysothamnus nauseosus* subsp. *nauseosus.* Colorado: McCoy. Apterous viviparae Aug. 24; rare.

Cotype. Knowlton and C. F. Smith Collections.

Chief Distinguishing Characters. Length of antennal IV (.57-.62, not equal to III) and length of V (not longer than .56), length of base of VI (not shorter than .15), length of body hairs on side (not longer than .015), length of cornicle (.48-.50, 5 times length of rostral IV+V and shorter than IV), length of cauda (not shorter than .35 for entire length).

This species is very close to *C. elongatus* and *pycnorhysus.*

Capitophorus filifoliae Palmer

Capitophorus filifoliae Palmer, 1938:355.

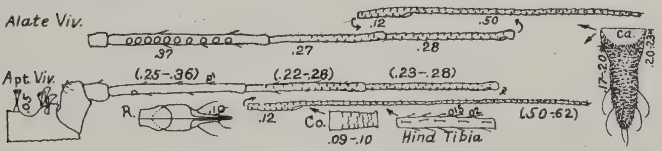

Fig. 304. *Capitophorus filifoliae*

Apterous Summer Vivipara. Entire dorsum medium green appearing pale and frosted due to numerous colorless capitate or rather funnel-shaped hairs; legs and cornicle pale yellowish, tarsi and tips of tibiae black; antenna dusky beyond III; cauda dusky. Body length 1.1-1.3; width across eyes .36; hind tibia .72-.80; hind tarsal II .10-.11; rostrum with needlelike tip in ventral aspect, attaining 2d or 3d coxa. Cornicle cylindrical or slightly tapering. Cauda elongate, slightly constricted near base, bearing 2 pairs of lateral hairs and 2 median preapical ones. Hairs on head and body funnel-shaped at tip and with short stalk; .03-.05 long on vertex; .01-.03 long on body; on appendages simple and blunt; .01 long.

Alate Vivipara. Color same as in aptera except head and thorax which are darker. Body length 1.4; antenna 1.70; hind tibia .72; hind tarsal II .10; rostrum attaining between 1st and 2d coxae. Other characters as in aptera described above.

Collections. On leaves of *Artemisia filifolia.* Colorado: Denver. Alate and apterous viviparae Aug. 27; apparently rare.

Type. U.S.N.M., No. 52349. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Short cornicle (.09-.10), long cauda (.17-.20, twice as long as cornicle), rostral IV+V with short needlelike tip and shape of hairs (funnel-shaped, with short stalk).

Capitophorus fragaefolii (Cockerell)

The Strawberry Aphid

Myzus fragaefolii Cockerell, 1901:101.
Capitophorus fragaefolii, Hottes and Frison, 1931a:283.
Capitophorus potentillae (Walker), (misidentification), Gillette and Palmer, 1934:153.
Capitophorus fragariae (Theobald), Thomas and Jacob, 1941:107; Hodson, 1937:409 (discussion of synonymy).

On *Fragaria* sp.:

Apterous Summer Vivipara. Pale yellowish or white; appendages pale; slightly dusky distally on appendages. Body length 1.25-1.30; hind tibia .76; hind tarsal II .09; antenna 1.60, III .40-.45, IV .22-.26, V .25-.29, VI .10+.50-.55; cornicle .40-.46; cauda .12 on median line, .15 on side; rostral IV+V .11 long, attaining 2d-3d coxa. Frontal tubercles well-developed, twice as high as vertex. Hairs strongly capitate; numerous and conspicuous on entire body; on vertex .04; on antennal I, II and III conspicuous .02-.03, on IV and V inconspicuous and .015; on hind tibia moderately capitate .01 long. Cornicle cylindrical, slightly curved, with slight flange and imbricated. Cauda tapering, with tendency to constriction near base, with 2 pairs of lateral hairs and a single dorsal preapical one.

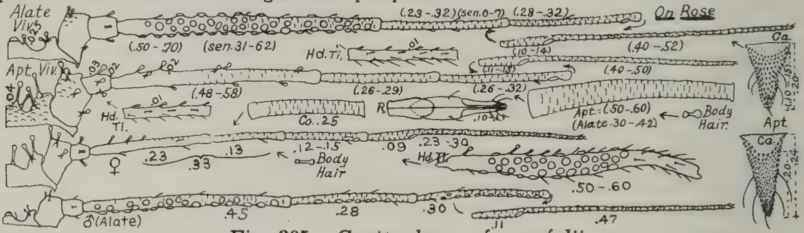

Fig. 305. *Capitophorus fragaefolii*

Alate Vivipara. Head and thorax dark; abdomen light green with dark dorsal patch and lateral areas; antenna dark, secondary sensoria tuberculate and numerous on III. Hairs shorter than in aptera. Otherwise same as aptera.

Male. Alate. Color as in alate vivipara except that dorsal patch is replaced by dorsal bands on all abdominal segments. Body length 1.20; antenna 1.40-1.65; numerous sensoria present on III, usually on IV, always on V; cornicle .22.

Ovipara. Apterous. Same as same form on rose, described below.

Collections. On leaves and stems of *Fragaria* sp. Colorado: Fort Collins and Golden. Arizona: Jerome. Alate viviparae (numerous spring migrants from rose) May 21, apterous summer viviparae April 27, July 16, and Dec. 17, alate viviparae Dec. 17, oviparae Oct. 24, males Oct. 17; often abundant and injurious.

Type. U.S.N.M.

On Rose: (Shown in figure).

Fundatrix. Color as in summer apterous vivipara. Body length 1.90; hind tibia .70; antenna .95, III .30, IV .14, V .16, VI .10+.18, III and IV partially coalesced; cornicle .35. Otherwise as in summer apterous vivipara.

Apterous Summer Vivipara. Pale green; appendages pale to slightly dusky. Body length 1.9-2; hind tibiae 1-1.1; hind tarsal II .10; antenna 1.6-2.12; rostrum obtuse, hardly attaining 2d coxa. Hairs as in form described on *Fragaria.* Ocular and lateral tubercles present.

Alate Vivipara. Head and thorax blackish; abdomen light green with dark dorsal patch and lateral areas; antenna dark; tibiae pale to dusky; cornicle and cauda pale.

Ovipara. Apterous. Color as in apterous summer vivipara. Body length 1.30-1.40; antenna .80-1; hind tibia swollen over most of length and thickly covered with numerous sensoria.

Male. Alate. Color as in alate vivipara except dorsal patch on abdomen replaced by short dorsal bands on each segment. Body length 1.30; antenna 1.60-1.80; sensoria present on III usually on IV and always on V; cornicle .20-.23.

Egg. Newly laid, pale yellowish green; later, black. Size .62 by .29.

Collections. On leaves and stems of rose. Colorado: Fort Collins, Boulder and Manitou. Utah: Throughout northern part of state. Fundatrices May 24, apterous summer viviparae April 14 to Oct. 31, alate viviparae May 21 to Nov. 1, sexuales Sept. 29 to Nov. 5; fairly common.

Migration of numerous alate viviparae from rose to strawberry and their abundant reproduction on the latter was observed.

On *Potentilla* the specimens (viviparae) differ in somewhat shorter antennal segments (III .30-.55, IV .17-.26, V .17-.27, VI .10-.12+.42-.62) excepting unguis which usually exceeds length of III while III exceeds unguis in the rose form.

Collections. On *Potentilla* sp., on leaves and stems. Colorado: Boulder, Fort Collins and Poudre Canyon. Apterous viviparae June 1 to Aug. 3, alate viviparae June 19 to Aug. 3; not rare.

Type specimens (8 apterous and one alate viviparae) taken on strawberry Dec. 17 at Jerome, Arizona, show shorter measurements than the Colorado specimens from rose or even strawberry but the larger ones agree with the smaller individuals from *Potentilla.* Measurements are as follows: *Apterous Vivipara.* Body length 1.1-1.25; antenna 1.2, III .26-.30, IV .18-.21, V .17-.19, VI .09-.11+.30-.45; cornicle .27-.33; cauda .07-.08 on median line, .09-.10 entire length; hind tibia .53-.65. *Alate Vivipara.* Body length 1.25; antennal III .40, IV .23, V .22, VI .11+.47, sensoria 28 on III, 5 on IV; cornicle .26; cauda .09 for entire length. These measurements agree very closely with those given for *C. fragariae* Theobald by Hodson (1937:409).

Our forms on *Potentilla,* wild rose and strawberry *(Fragaria* sp.) seem to agree except slight and rather unstable differences in length and proportions of antennal segments and cornicles; however intergrading forms occur so that no definite line of distinction can be drawn. Hodson (op. cit.) considers Cockerell's species distinct from *C. potentillae* (Walker) and feels confirmed in his conclusion after examining specimens sent him but Essig (in correspondence) after also studying the same specimens states that he is not convinced of any significant difference. Though the differences given seem slight and uncertain it seems best, for the present, to treat the American form as distinct.

This species is distinguished from *C. minor* chiefly by the conspicuous capitate hairs, especially in apterae on antennal I, II and III and on entire dorsum of body. Forbes species shows conspicuous capitate hairs only on anterior and posterior portions of body and not on antenna.

Capitophorus gnaphalodes Palmer

Capitophorus gnaphalodes Palmer, 1938:356.

Apterous Summer Vivipara. Entire dorsum pale green; appearing frosted due to capitate hairs; antenna dusky beyond base of III, tibiae pale brownish with tips and tarsi blackish; cornicle pale with brownish tip; cauda pale. Body length 1.30-1.80 long; width across eyes .43; antenna 2.40-2.80; hind tibia 1.03-1.30; rostrum surpassing 2d coxa. Cauda tapering, acute to nearly spatulate, bearing 2 pairs of lateral hairs and a single dorsal preapical one. Cornicle slightly clavate.

Collections. On *Artemisia ludoviciana* subsp. *typica* on underside of leaves, not curling leaves. Colorado: Pingree Park. Apterous viviparae Aug. 21 to 26.

Type. U.S.N.M., No. 52350. Paratypes, Colo. Agr. Exp. Sta. Collection.

This species differs from *C. pseudoglandulosus* as follows: Length of cauda (much more than half as long as cornicle instead of third), hairs on head less slender, appendages, cauda and rostral IV+V longer and cornicle shorter (not .40-.48) than in the latter species.

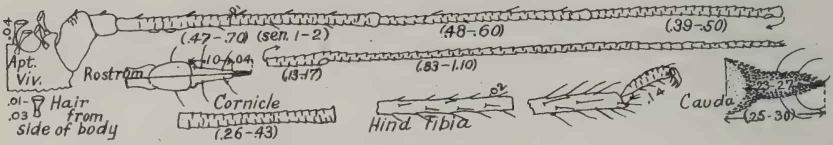

Fig. 306. *Capitophorus gnaphalodes*

Capitophorus gregarius Knowlton

Capitophorus gregarius **Knowlton, 1929b:13; Knowlton and Smith, 1936c:110.**

Apterous Vivipara. Spring Form. Dark brown to chocolate-brown; antenna dark brown to black; cornicle black; cauda dusky. Body length 2.3-3. *Summer and Fall Form.* "Brown to greenish brown"; antenna beginning with distal end of III, cornicle especially distally, tarsi and tips of tibiae and of rostrum blackish to black; tibiae and cauda pale to dusky. Body length 2-3; across eyes .48-.54; antenna 3-4; hind tibia 1.15-1.40-"1.70"; rostrum attaining 2d coxa. Abdomen with a row of conspicuous dorsal tubercles on each side of median line, each bearing infundibulate hairs. Hairs stout, slightly capitate to infundibulate and sessile on body and antennal I and II; blunt to slightly capitate on III and hind tibia; very numerous on body.

Alate Vivipara. Antenna pale through base of III, remainder blackish; cornicle pale at base, blackish distally; cauda and tibiae pale to sordid yellow. Body length 1.60; across eyes .50; antenna 3.50; hind tibia 1.55. Cornicle clavate, flange oblique, imbricated. Cauda parallel-sided to slightly tapering, bearing 5-6 hairs on each side and 1-2 dorsal preapical ones.

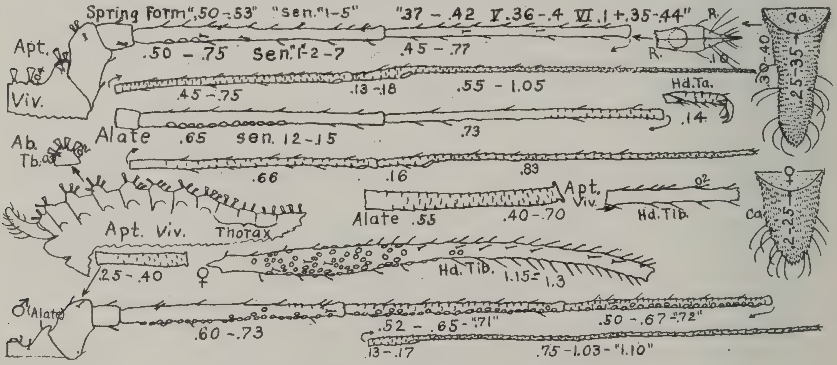

Fig. 307. *Capitophorus gregarius*

Ovipara. Apterous. "Greenish brown to tan with dorsal dark bands and lateral areas on abdomen;" hind tibia dark on swollen portion. Otherwise as in apterous vivipara except cauda which is shorter, broader and tapering and hind tibia which is swollen on proximal third to twice the diameter of the narrowest part and bearing numerous sensoria.

Male. Alate. "Blackish brown"; dark markings as in alate vivipara. Body length about 1.50-"1.75"; across eyes .41-.43; antenna about 3; III, IV and V bearing numerous sensoria along posterior side; hind tibia 1.20-1.50.

Collections. On *Chrysothamnus nauseosus* subsp. *nauseosus* and *C. viscidiflorus,* on growing tips and on leaves. Colorado: Gateway. Utah: Generally in northern part of state. Idaho: Battle Creek, Emigration Canyon and Stone. Alate viviparae July 3, apterous viviparae May 17 to Oct. 6, sexuales Oct. 6 to Nov. 7; in large colonies, rather common.

Cotypes. U.S.N.M. and Utah and Colo. Agr. Exp. Sta. and Knowlton Collections.

Chief Distinguishing Characters. Dorsal abdominal tubercles, brown body, number of hairs on cauda (more than 3 pairs) and sessile character of body hairs.

Capitophorus heterohirsutus Gillette and Palmer

Capitophorus heterohirsutus Gillette and Palmer, 1933:351 and 1934:151.

Apterous Summer Vivipara. Color pale green, appearing frosted due to numerous infundibulate hairs; cornicle and appendages pale brownish to dusky. Body length* 1.50; hind tibia .58; antenna 1.27; rostrum acute, portion beyond hairs needlelike in ventral aspect, barely attaining 3d coxa. Hairs on vertex and dorsum of body varying from flattened infundibulate, without stalk, and .015-.02 long, to cylindrical and .03-.04 long or occasionally pointed and .07-.10 long (in nymph all hairs pointed); on antenna and hind tibia pointed. Lateral tubercles not evident. Ocular tubercle rudimentary. Terminal pad on tibia not evident. Cornicle cylindrical. Cauda tapering with slight neck, acute at tip and bearing 2 pairs of lateral hairs and a single preapical one.

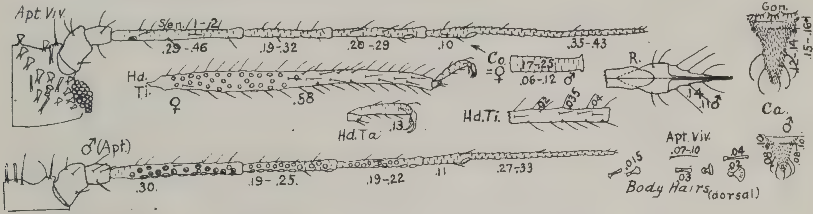

Fig. 308. *Capitophorus heterohirsutus*

Ovipara. Apterous. Same as apterous vivipara except hind tibia swollen on proximal third or nearly half and bearing scattered small sensoria.

Male. Apterous. Brown; with frosted appearance due to numerous funnel-shaped hairs; appendages brownish. Body length 1; across eyes .35; hind tibia .57; antenna 1.20-1.40, III, IV and V bearing numerous sensoria; cornicle .06-.12.

Collections. On leaves and twigs of *Artemisia tridentata.* Colorado: Sheep Creek (in Northern Larimer County). Utah: Uinta Mountains and Sardine Canyon. Wyoming: Douglas. Apterous summer viviparae Aug. 13 and Sept. 17, oviparae and males Sept. 17; few collections but on these occasions numerous, in crowded colonies covering one entire young plant.

Type. U.S.N.M., No. 49297. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Heterogeneous character of the hairs (varying from sessile funnel-shaped to long, simple and pointed), short cylindrical cornicle (shorter than V) and green body in viviparae.

Capitophorus hippophaes (Walker)

Aphis hippophaes Walker, 1852:1036.

Rhopalosiphum hippophaes Koch (synonym in part), Gillette and Bragg, 1915a:101; Gillette, 1915b:375.

Capitophorus gillettei Theobald, 1926:238; Gillette and Palmer, 1934:149; Hille Ris Lambers, 1933:173 (synonymy).

Fundatrix. Length 1.70; hind tibia .75; antenna 1.05, III+IV coalesced .37, V .17, VI .12+.30; cornicle .45; cauda .15 on median line, .18 on side. Otherwise as in summer apterous vivipara.

Apterous Summer Vivipara. Young Nymph. Colorless with red dorsomedian line. *Adult.* Pale greenish yellow with scattered reddish streaks due to embryos showing through body wall; cornicle, cauda and appendages pale to slightly dusky. Body length 1.20-1.50; hind tibia .78-.95; antenna 1.70-2.30; rostrum with tip in ventral aspect, ending in needlelike point, attaining 3d coxa. Cornicle clavate with swelling on inner side of distal third. Cauda tapering with narrow elongated tip, bearing 4 pairs of lateral hairs. Hairs capitate to globate with elongate stalk; evident on body only on mesonotum and terminal abdominal segments; on head, on vertex and on I; on remaining antennal segments blunt, very drooping.

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*Specimens taken in Utah on *Artemisia* sp. show somewhat longer appendages.

Alate Vivipara. Head and thorax brown; abdomen pale yellow with lateral areas on II, III and IV, narrow dorsal dash on II and dorsal patch on III, IV and V dark brown; antenna blackish beyond base of III; cauda pale yellow; tibiae and cornicle sordid to slightly dusky, darker at tip; tarsi blackish. Otherwise same as apterous vivipara except the following: Hind tibia .92-1.1; rostrum attaining only to 2d coxa. Hairs blunt to capitate on vertex and antennal I on remaining antennal segments blunt, very drooping and sparse; on hind tibia blunt.

Ovipara. Apterous. Mustard-yellow shading laterally to rufous ferruginous; all appendages colorless except antenna, tarsi and tips of tibiae which are dusky. Body length 1.70; hind tibia .70; antenna 1.30; cornicle .45. Otherwise as in apterous vivipara except that nearly three-quarters of proximal portion of hind tibia is distinctly swollen and thickly covered with sensoria.

Male. Alate. Head and thorax dark brown; abdomen rich yellow shading to greenish with short dorsal bands on all segments, often pale or broken on anterior and posterior segments; appendages as in alate vivipara. Body length 1.55-1.70; hind tibia .80-1; antenna 1.70-2.

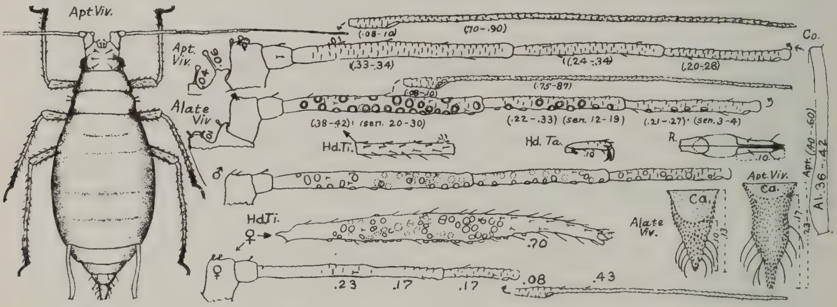

Fig. 309. *Capitophorus hippophaes*

Collections. On leaves and stems of *Hippophae rhamnoides* and *Eleagnus* sp. as winter hosts; *Polygonum* sp. as summer host. Colorado: Boulder, Eagle and Fort Collins. Utah: Morgan. Fundatrices March 9 to May 20, apterous summer viviparae June 2 to Oct. 21 on summer host, alate viviparae May 20 to Oct. 21 on summer host, males Sept. 16 to Oct. 20 on summer host, oviparae Oct. 5 to Nov. 9 on winter host; common.

Theobald (op. cit.) contended that Walker's species (he does not state whether he observed Walker's types) was identical with Koch's *R. hippophaes* and that the latter differed from Gillette's species in the presence of conspicuous capitate hairs on body of aptera. He therefore erected Gillette's species as new and named it *gillettei.* Hille Ris Lambers (op. cit.) considers *C. gillettei* as a synonym of *C. hippophaes* (Walker) and his conclusion (he also fails to mention whether he observed Walker's types) seems to be supported by Walker's statement "front bristly" in aptera, which implies absence of noticeable hairs on the rest of the body, which character agrees with Theobald's *gillettei.*

Chief Distinguishing Characters. Absence of noticeable hairs in apterous vivipara posterior to mesothorax except on tip of abdomen, clavate cornicle, long unguis (2 to near 3 times III), length of rostral IV+V (.10), presence of sensoria on V and moderately long stalk of the hairs on apterous vivipara.

Capitophorus infrequens Knowlton and Smith

Capitophorus infrequens Knowlton and Smith, 1936e:231.

Apterous Summer Vivipara. (Mounted on slide), body pale; legs, cornicle and cauda pale; antenna beyond middle of IV and entire tarsi dusky. Body length 1.40; across eyes .33; antenna 1.10; hind tibia .55; rostrum attaining 2d coxa. Hairs infundibulate and stalked on body; blunt and inconspicuous on appendages. Cornicle slightly clavate, hardly imbricated. Cauda parallel-sided, blunt, bearing 2 pairs of lateral hairs.

Collections. On leaves of *Artemisia tridentata.* Utah: Big Cottonwood Canyon. Apterous viviparae Aug. 22; apparently rare.

Type. Knowlton Collection. Paratypes, U.S.N.M. and C. F. Smith Collection.

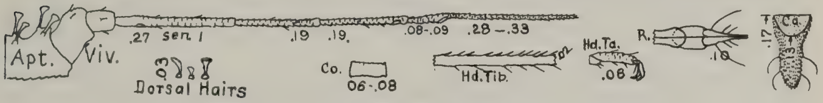

Fig. 310. *Capitophorus infrequens*

Chief Distinguishing Characters. Very short cornicle (hardly as long as the hind tarsal II), length of cauda (not longer than 1.5 times base of VI), and length of unguis (shorter than 1.5 times III).

Capitophorus longinectarius Gillette and Palmer

Capitophorus longinectarius Gillette and Palmer, 1933:352 and 1934:151.

Apterous Vivipara. Pea-green, appearing frosted due to funnel-shaped hairs; cornicle and appendages pale to brownish. Body length 2.30-2.45; hind tibia 1.15-1.77; antenna 3-4.90; rostrum acute, tip needlelike in ventral aspect, surpassing 2d coxa. Hairs on vertex funnel-shaped, with slender stalk, set on tubercles; on antennal I funnel-shaped to fingerlike, on II same or slightly smaller; on III merely blunt, rather numerous; on hind tibia pointed or blunt, very drooping, numerous; on body funnel-shaped, with short stalk to sessile, set on tubercles, very numerous. Tibiae without terminal pad. Lateral and ocular tubercles not evident. Cornicle slightly swollen just before flange, imbricated. Cauda elongate-tapering, bearing 2 pairs of lateral hairs and a single dorsal preapical one.

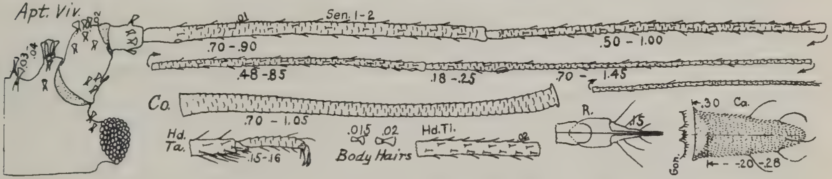

Fig. 311. *Capitophorus longinectarius*

Collections. On leaves and stems of *Artemisia longifolia.* Wyoming: Colorado-Wyoming line at Chimney Rock (east of Jelm). Utah: Mount Timpanogos. Apterous summer viviparae June 26 and July 26; rare.

Type. U.S.N.M., No. 49298. Paratypes, Colo. Agr. Exp. Sta. and Knowlton Collections.

Chief Distinguishing Characters. Extremely long cornicle (.90-1, equalling or exceeding III), long IV (often longer than III) and funnel-shaped hairs with short stalk to sessile.

Capitophorus longipes (Gillette and Palmer) n. comb.

(Plate III, 1-2)

Macrosiphum longipes Gillette and Palmer, 1928:1 and 1934:186; Knowlton and Allen, 1938c:81.

Apterous Summer Vivipara. Paris-green; powdery, giving glaucous green effect, coinciding with color of leaves of host plant; cauda and anal plate pale or slightly dusky; cornicle, rostrum, legs and antenna beyond II black, I and II dusky. Body length 2.4-2.96; across eyes, .65-.67; hind tibia 2.5-3; antenna 4.7-5.3; rostrum surpassing 2d coxa. Hairs simple to slightly capitate; on hind tibia .05-.08; on side of abdomen .03-.05. Ocular tubercle absent; eyes protruding. Cornicle slender, slightly clavate at tip, imbricated and with very small flange, bearing 2-5 short hairs. Cauda tapering, broad, width at base about equal to half the length, bearing two pairs of lateral hairs and a single dorsal preapical one.

Alate Vivipara. Head and thorax yellowish brown, covered with powder. Otherwise same as apterous summer vivipara except as follows: Rostrum merely attaining 2d coxa. Wing veins bordered with dusky and hairs slightly shorter. Sensoria present on III but small, weak and scattered.

Ovipara. Apterous. (Cleared and mounted), body immaculate, without dusky areas at bases of hairs; rostrum, especially IV+V, cornicle, tarsi and antenna beyond II black; coxae and distal portion of femora dusky; tibiae dusky with black tips; cauda, anal plate and genital plate pale to slightly dusky. Measurements as in apterous vivipara. Cauda with width greater than half the length, bearing 3 pairs of lateral hairs and 4 scattered dorsal hairs not near tip. Proximal sixth to fifth of hind tibia slightly swollen and bearing about 22 irregular-shaped sensoria.

Male. Apterous. Color same as ovipara as described above or slightly darker and with head dark. Body length 2; hind tibia 2-2.30; antenna 4.50; cornicle .60-.70; cauda .13-.15; III and IV bearing rather numerous small sensoria.

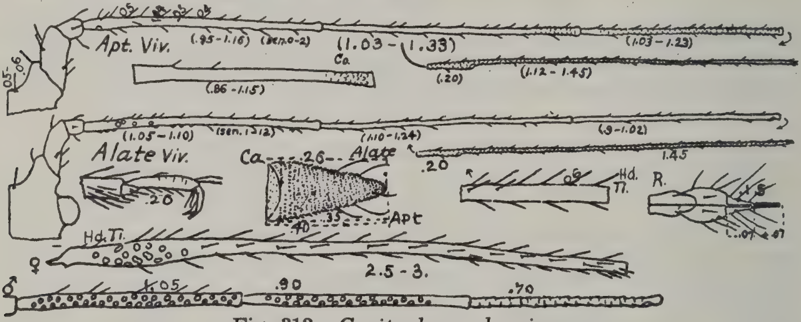

Fig. 312. *Capitophorus longipes*

Collections. On leaves of *Artemisia tridentata.* Colorado: Estes Park, North Park, Gould and Boulder Ridge Road (in Northern Larimer County), State Bridge (near Wolcott) and Eggers. Utah: Cottonwood and Logan Canyons. Apterous summer viviparae July 30 to Sept. 12, alate viviparae July 30, sexuales Sept. 23; solitary, apparently rare; hard to find on account of solitary habit and protective coloration.

Types. U.S.N.M., No. 41969. Paratypes, Colo. Agr. Exp. Sta. and Hottes Collections.

This species does not fit this genus in all respects but on account of the clavate shape of the cornicle and short tapering cauda it seems to fit *Capitophorus* better than any other genus known at present.

Chief Distinguishing Characters. Protruding eye, lacking ocular tubercle, slightly capitate to simple hairs, short broad cauda with only 2 pairs of lateral hairs, slender shape of body and long legs (hind tibia about equal to the body in length), glaucous green body, ventrally needlelike tip of the rostrum, small weak sensoria on antenna, absence of sensoria in the male on V and their presence on IV.

Capitophorus magnautensis Knowlton and Smith

Capitophorus magnautensis **Knowlton and Smith, 1936c:110.**

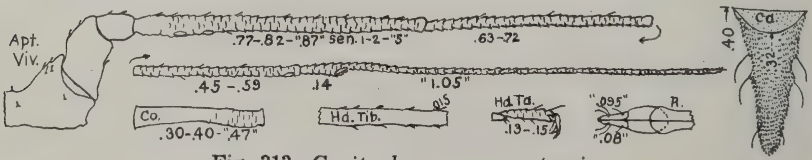

Fig. 313. *Capitophorus magnautensis*

Apterous Summer Vivipara. "Green." (Mounted on slides), immaculate with cauda and legs pale; antenna beyond II and tips of tibiae dusky to blackish; cornicle and tarsi and extreme tip of rostrum black. Body length 2.1-"2.60"; across eyes .52-.55; antenna 3.20-3.50;

hind tibia 1.53-1.75-"2.02"; rostrum, obtuse, attaining 2d coxa. Hairs on body inconspicuous "blunt to flattened," sparse. Cauda tapering, bearing 2 pairs of lateral hairs on proximal half and one pair near tip. Cornicle clavate, somewhat imbricated.

Collections. On leaves of *Chrysothamnus viscidiflorus.* Utah: Fort Duchesne, Myton and Randlett. Apterous viviparae July 14; apparently rare.

Type. Either Knowlton or C. F. Smith Collection. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Length of body (2 or more), length of antenna (3 or more), length of III (8-10 times rostral IV+V and twice cornicle length) and number of caudal hairs (2 lateral pairs and 1 dorsal preapical pair).

Capitophorus minor (Forbes)

Siphonophora minor Forbes, 1884:101.
Capitophorus minor, Hottes and Frison, 1931a:284; Gillette and Palmer, 1934:152.

Apterous Summer Vivipara. Pale greenish yellow; appendages pale proximally, dusky distally. Body length 1.10-1.20; hind tibia .60-.65; hind tarsal II .08; antenna 1.30; rostrum attaining 2d coxa. Hairs capitate on body; on antennal II to VI and tibiae hardly more than blunt; on body noticeable only on anterior and porterior segments. Cornicle cylindrical, imbricated. Cauda tapering, rather acute at tip, bearing 2 pairs of lateral hairs and a single dorsal preapical one.

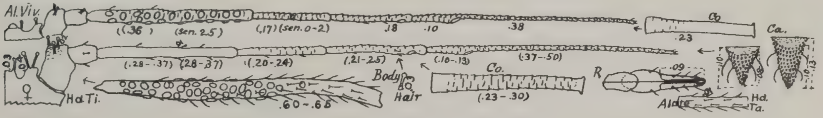

Fig. 314. *Capitophorus minor*

Alate Vivipara. Head and thorax dark; abdomen pale greenish yellow with dusky lateral areas and dorsal patch; antenna dusky; cornicle, cauda and legs pale with tarsi and tips of tibiae dark. Measurements as in apterous vivipara.

Ovipara. Apterous. Same as apterous vivipara except proximal two-thirds of hind tibia moderately swollen and bearing numerous large sensoria.

Apterous Male. (Mounted on slide), body immaculate; appendages pale with tarsi and tips of tibiae dusky; antenna beyond base of III black. Body length, 90; hind tibia .55; antenna 1.30, III .26, IV .19, V .21, VI .10+.50, a few minute sensoria along posterior side of III, IV and V; cornicle .20. Otherwise as in apterous vivipara.

Alate Male. Body length .90; hind tibia .75; antenna 1.6, III .37-.47, IV .24-.28, V .28-.32, VI .12+.45-.47, sensoria hardly tuberculate, 15-18 on III, 7-8 on IV, 7-8 on V. These males were taken in copula with oviparae which exhibit characters of this species. However, these males exhibit measurements agreeing with *C. fragaefolii.* They agree with alate males determined as belonging to this species and described by Hottes and Frison (op. cit.). This observation seems to throw some doubt on the distinctness of these two species.

Collections. On leaves and stems of *Fragaria* sp. Colorado: Fort Collins. Utah: Provo Bench. Alate viviparae Sept. 21, apterous summer viviparae Oct. 25, sexuales Oct. 25 and Nov. 1; rare.

Lectotype. Ill. Nat. Hist. Surv. Collection, Slide No. 3158.

Chief Distinguishing Characters. Hairs on abdomen of aptera very sparse or absent except on posterior segments and short cornicle (.23-.33).

Capitophorus oestlundi Knowlton

Capitophorus oestlundi Knowlton, 1927d:235; Gillette and Palmer, 1934:153.

Apterous Summer Vivipara. Bluish green to apple-green, slightly pruinose; cauda pale to dusky; cornicle and appendages pale except tips of tibiae and antenna beyond middle of V and tips of III and IV which are blackish. Body length 1.45-1.80; hind tibia .80-1; hind tarsal II .11-.13; antenna 2-2.65; rostrum acute, attaining 2d coxa. Hairs spatulate to fan-shaped or funnel-shaped, on body .03 long, numerous and conspicuous on all segments; on antenna and tibiae blunt to slightly capitate, very drooping and inconspicuous. Ocular tubercle inconspicuous. Eye prominent. Cornicle slightly clavate, often curved outward, cauda elongate-tapering or with slight neck, bearing 3 pairs of simple lateral hairs and 3 spatulate dorsal hairs.

Alate Vivipara. Same in color and measurements as apterous vivipara except rostrum attaining between 2d and 3d coxae and hairs shorter and less expanded at tips.

Ovipara. Apterous. Same as apterous vivipara except hind tibia the proximal half of which is moderately swollen and bearing numerous rather large sensoria. Hairs on cauda may all be simple.

Male. Alate. Reddish to blackish brown. Otherwise as in alate vivipara except as figured.

Collections. On leaves of *Chrysothamnus nauseosus* subspp. *graveolens* and *nauseosus, C. parryi, C. viscidiflorus* and *C. plattensis.* Throughout region. Apterous summer viviparae May 17 to Nov. 12, alate viviparae May 31, sexuales Oct. 3 to Nov. 29; rather common.

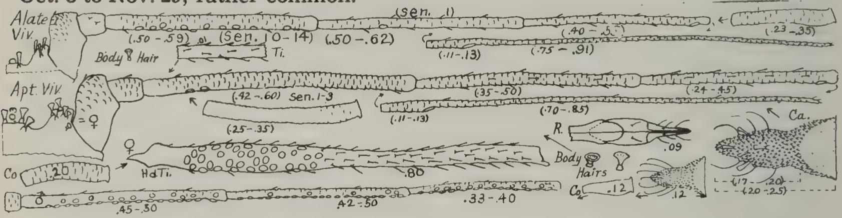

Fig. 315. *Capitophorus oestlundi*

Cotypes. U.S.N.M. and Colo. and Utah Agr. Exp. Sta., Univ. of Minn. and Knowlton Collections.

Chief Distinguishing Characters. Presence of about 3 spatulate hairs on cauda, sessile funnel-shaped hairs, which are numerous over entire dorsum, slightly clavate, short cornicle and short, acute rostral IV+V (.09) bearing long hairs but not with ventrally needlelike tip.

Capitophorus packi (Knowlton) n. comb.

Macrosiphum packi Knowlton, 1928b:169 and 1928d:81; Gillette and Palmer, 1934:191.

Apterous Summer Vivipara. Apple-green to yellow, without markings; appearing frosted due to pale funnel-shaped hairs; cauda and anal plate pale; tibiae dusky especially at tips; cornicle except at base, antenna beyond base of III, tarsi and rostral IV+V black. Body length 3-3.45; hind tibia 1.5-2; hind tarsal II .16-.19; antenna 3.80-4.50; rostrum acute but not with needlelike tip, attaining 2d coxa. Hairs on vertex slightly capitate; on III and hind tibia blunt, on dorsum of body funnel-shaped, sessile on tubercles, numerous, .02-.025 long on side of abdomen. Cornicle slightly clavate at tip, often curved, slender, imbricated. Cauda tapering to spatulate, with slight neck and bearing 3-5 pairs of lateral hairs and a single dorsal preapical one.

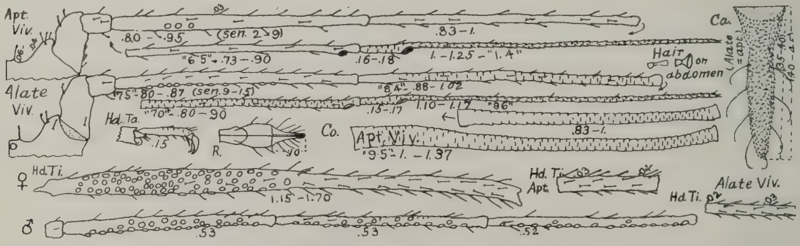

Fig. 316. *Capitophorus packi*

Alate Vivipara. Head and thorax yellow-brown; abdomen yellowish olive-green; entire body appearing frosted. Otherwise as in apterous vivipara except as follows: Body length 1.60-2; rostrum hardly attaining 2d coxa. Veins of wings rather heavy and slightly bordered.

Ovipara. Apterous. Olive-green with yellow area about base of each cornicle; antenna beyond base of III, cornicle except at base, rostral IV+V, tarsi and swollen portion of hind tibia black; tips of tibiae brown; cauda and anal plate pale or slightly dusky. Body length 2-2.5; hind tibia 1.15-1.70; antenna 4; cornicle .60-.70; cauda .28 on median line and broad at base. Proximal half of hind tibia swollen to twice diameter of narrowest portion and rather thickly covered with sensoria.

Male. Alate. Head and thorax black; abdomen dark olive-green; with dusky dorsal bands (broken into 2 rows) and lateral areas; frosted; appendages black or blackish. Body length 1.90-2; hind tibia 1.45-1.60; antenna 3.

Collections. On leaves of *Chrysothamnus nauseosus* subspp. *graveolens* and *nauseosus* and *C. parryi.* Colorado: Wellington, Bellvue, LaPorte, Elk Springs and Fort Collins. Utah: Throughout state. Apterous summer viviparae April 30 to Nov. 2, alate viviparae June 27 and 28, sexuales Oct. 26 to Nov. 8; not abundant.

A large collection made on *C. nauseosus* subsp. *typicus* in Colorado on the Laramie River near Sand Creek Pass Sept. 23, consisting of apterous viviparae, oviparae and alate males, differs only in slightly shorter cornicle in the apterous vivipara (.60-.93), shorter antenna (III .75-.90, IV .72-.80, V .63-.68, VI .14-.15+.83-1) and slightly smaller body size. As no definite line of separation can, at present, be drawn it seems best to leave the two forms under the same name.

Cotypes. U.S.N.M., Utah and Colo. Agr. Exp. Sta. and Knowlton Collections.

Chief Distinguishing Characters. Long slender cornicle (equalling or exceeding antennal III), pronounced frontal tubercles, long Macrosiphumlike cauda, short, acute rostral IV+V, small number of sensoria on III (not over 15 in alate vivipara and not over 7 in aptera), long IV (equalling or exceeding III) and character of hairs (merely blunt on vertex, sessile funnel-shaped to elongate-capitate or blunt on dorsum of body and pointed on venter).

Capitophorus palmerae Knowlton

Capitophorus elongatus Knowlton (alleged misidentification), Gillette and Palmer, 1934:148.
Capitophorus palmerae Knowlton, 1935b:282.
Capitophorus chlorophainus Knowlton and Smith, 1936c:109 (new synonymy).

This species is doubtfully, in the mind of the writer, separated from *C. elongatus* Knowlton; the only difference seeming to be more numerous hairs on the abdomen of *C. palmerae.* The flattened or indented anal plate mentioned by Knowlton for *elongatus* does not appear in all specimens; tendency to more numerous sensoria claimed for *palmerae* by Knowlton likewise does not appear in all specimens and the difference claimed in the length of rostral IV+V did not appear appreciable from observation of types and metatypes. It appears best, however, to leave the species distinct till more information on the other life cycle forms is available.

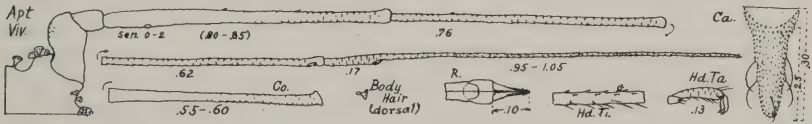

Fig. 317. *Capitophorus palmerae*

Chief Distinguishing Characters. Shape of hairs on the vertex (funnel-shaped), length of hairs on antenna and hind tibia (almost invisible), color of cornicle (pale), length of cornicle (not longer than three-quarters of antennal III) and number of hairs on cauda (2 pairs of lateral hairs).

Collections. On leaves of *Chrysothamnus nauseosus* subsp. *typicus* and *C. viscidiflorus.* Colorado: Cache la Poudre and Laramie Rivers, Gould and Estes Park. Utah: Beaver Canyon. Apterous viviparae Aug. 6 to Sept. 16; rare.

Paratypes. U.S.N.M. and Colo. Agr. Exp. Sta. and Essig Collections.

Capitophorus pseudoglandulosus n. sp.

Capitophorus glandulosus (Kaltenbach) (misidentification), Gillette and Palmer, 1934:149.

Apterous Summer Vivipara. Pale bluish green, with frosted appearance, except on median line, due to numerous white funnel-shaped hairs; appendages pale to slightly dusky;

tarsi, tips of tibiae and of antenna dusky. Body length 1.10; hind tibia .75-.80; hind tarsal II .11; antenna 2-2.2; cornicle .40-.50; rostrum attaining between 2d and 3d coxae. Cornicle slightly clavate just before tip, imbricated. Cauda tapering, acute, bearing 2 pairs of lateral hairs and a single dorsal preapical one. Hairs funnel-shaped on slender stalk on vertex; stalked to sessile on body, .03 long; on antenna and hind tibia merely blunt, recumbent. Ocular tubercle rudimentary. Lateral tubercles not evident.

Alate Vivipara. Head, pronotum and abdomen pale green; thorax pale brown; abdomen with slightly dusky lateral areas; appendages as in aptera. Body length 1.5; hind tibiia 1-1.15; antenna 3.

Ovipara. Apterous. Greenish to reddish. Measurements about as in apterous vivipara. Proximal half of hind tibia very slightly swollen and bearing a few irregular rather scattered sensoria.

Male. Apterous. About same in color as ovipara. Body length 1.22; hind tibia .95; antenna 2.44; cornicle .35.

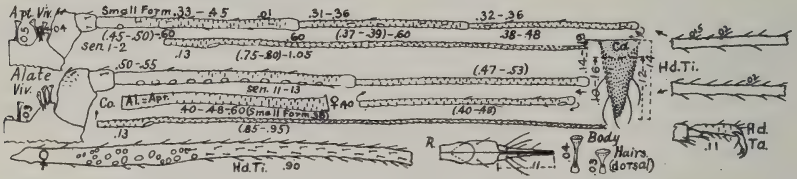

Fig. 318. *Capitophorus pseudoglandulosus*

Egg. Newly laid, pale yellow; later, black. Size .60 by .26.

Collections. On leaves and stems of *Artemisia frigida, A. tridentata* and *A. ludoviciana.* Colorado: Fort Collins, Laramie-Poudre Tunnel, Cameron Pass, Pingree Park, Estes Park, Bellvue and Boulder. Generally in northern Utah and southern Idaho. Fundatrices (?) March 20, apterous summer viviparae April 11 to Nov. 30, alate viviparae April 15 to Aug. 14, sexuales Oct. 12 to Nov. 30; common but difficult to find on account of protective coloration, solitary habit and agility in escaping.

Type. U.S.N.M., No. 59326. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Shape of hairs (funnel-shaped with slender stalk), length of antenna (twice as long as body), length of cauda (fourth to third of cornicle), length of cornicle (coequal with antennal III and IV), shape of cornicle (slightly clavate) and rostrum with needlelike tip.

This species differs from *C. glandulosus* (Kaltenbach) (European specimens of apterous viviparae determined by Hille Ris Lambers) as follows: Slightly smaller size in all measurements, excepting cornicle and unguis, shape of rostrum (more slender and in ventral aspect needlelike tip), length of rostral IV+V (.11-.12 instead of .10-.11) and length of cornicle (3-4 times length of median portion of cauda instead of barely 3 times). The crossbands on alata mentioned by Kaltenbach have not been observed in Colorado examples.

Capitophorus pullus Gillette and Palmer

Capitophorus pullus **Gillette and Palmer, 1933:353 and 1934:155.**

Alate Vivipara. Head and thorax dark brown to blackish; abdomen medium brown, (cleared and mounted on slide), with only traces of dorsal dashes on abdomen; cauda, anal and genital plates, and appendages dusky to black; cornicle black; veins of fore wing heavy. Body length 2; across eyes .43-.46; hind tibia 1.05-1.18; antenna 1.95-2.05; rostrum acute, tip needlelike in ventral aspect, attaining barely to 2d coxa. Cornicle cylindrical or slightly clavate, imbricated. Cauda elongate, tapering, bearing 2-3 pairs of lateral hairs. Hairs on vertex pointed to blunt or cylindrical; on occiput and on dorsum of abdomen funnel-shaped, sessile on tubercle, .01-.015 long; on venter pointed but with occasional funnel-shaped hair; on antenna blunt to pointed, on hind tibia pointed, .02-.04 long; on side of abdomen sessile, funnel-shaped to cylindrical, .01-.04 long. Ocular tubercle rudimentary. Terminal pad on tibiae very inconspicuous.

Apterous Summer Vivipara. Same as alata except as follows: Antenna 1.3-1.7; hind tibia .85-1.05. Hairs sessile, funnel-shaped to cylindrical, on dorsum of entire body .015-.04 long; on vertex pointed to blunt to slightly funnel-shaped with stalk; on antenna and on hind tibia pointed.

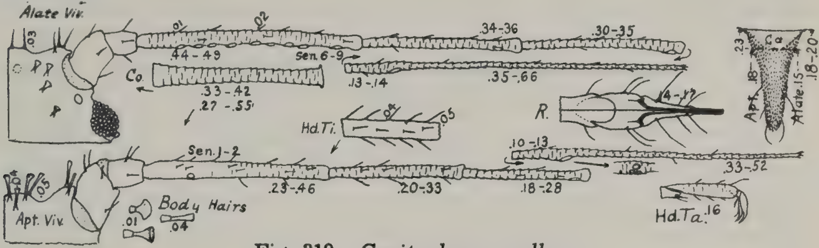

Fig. 319. *Capitophorus pullus*

Collections. On leaves of *Artemisia longifolia.* Colorado-Wyoming line at Chimney Rock (near Jelm, Wyoming). Utah: Logan Canyon. Apterous and alate viviparae June 26, alate viviparae July 6; rare, but quite plentiful and in large colonies where found.

Type. U.S.N.M., No. 49293. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Brown body, two kinds of hairs (funnel-shaped and pointed) on head and cornicle length (not shorter than III).

Capitophorus pycnorhysus Knowlton and Smith

Capitophorus pycnorhysus Knowlton and Smith, 1936c:111.

Apterous Summer Vivipara. "Pale to apple-green." (Mounted on slide), body immaculate with tibiae sordid yellow; antenna beginning with tip of III dusky; tarsi, tips of tibiae and of rostrum blackish; cauda, anal plate and cornicle pale. Body length 1.3-2; across eyes .44-.47; antenna about 2.70; hind tibia 1.00-1.50; rostrum attaining 2d coxa; hairs on body broadly to narrowly infundibulate, rather sparse. Cauda slightly narrowed at neck or tapering, bearing 2 pairs of lateral hairs and a single dorsal preapical one. Cornicle slightly clavate or at least with flange oblique, imbricated.

Alate Vivipara. Same as aptera or appendages darker, cornicle pale proximally and dusky distally; tibiae and antenna, after base of III, dusky. Body length 1.50; antenna about 2.70; hind tibia 1.30; rostrum attaining 2d coxa. Otherwise as in aptera.

Collections. On *Chrysothamnus viscidiflorus, Gutierrezia* sp. and *Artemisia* sp. Generally in northern Utah and southern Idaho. Apterous and alate viviparae June 9 to Aug. 25; apparently rather common.

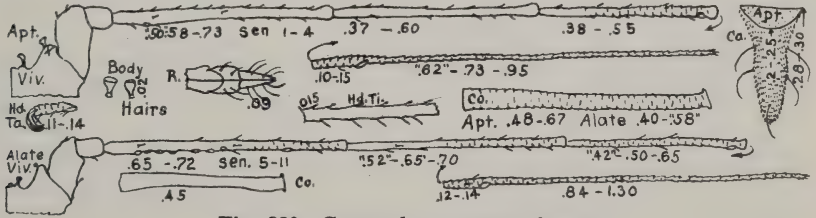

Fig. 320. *Capitophorus pycnorhysus*

Type. U.S.N.M. or Knowlton Collection. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Shape of hairs on vertex (slender-infundibulate to almost stalked), length of cornicle (longer than IV and 5.5-7 times length of rostral IV+V), length of IV and V (each shorter than cornicle), pale green body, length of VI (.10-.14, about the same as hind tarsal II) and shape of the tip of rostral IV+V (acute but not needlelike in ventral aspect).

This species is very close to C. *feragaeus* but differs in points 1, 2 and 5, above. These differences are slight and doubtful, especially on account of the small number of the latter which have been observed. The settlement of the status of this species awaits the collection of more specimens, especially more life cycle forms of the latter.

Capitophorus quadritrichus Knowlton and Smith

Capitophorus quadritrichus Knowlton and Smith, 1936e:233.

Apterous Summer Vivipara. "Bluish green, appearing grayish"; antennal I and II and beyond proximal half of IV, coxae, femora, knees, tips of tibiae, tarsi, rostral III and IV+V, and cornicle black or blackish; cauda and anal and genital plates dusky; tibiae pale. Body length 1.10-1.8; across eyes .37-.42; antenna 1.45-2.20; hind tibia .85-1.30-"1.40"; rostrum acute with needlelike tip in ventral aspect, attaining or surpassing 3d coxa. Hairs on vertex flattened or narrow funnel-shaped with stalk; on antennal I and II blunt to slightly globate and inconspicuous; on III blunt, short and sparse; on body funnel-shaped, with slight stalk or sessile, numerous; on hind tibia slightly globate, fairly numerous. Cornicle slightly clavate, slender. Cauda spatulate, bearing 2 pairs of lateral hairs and a single dorsal preapical one.

Alate Vivipara. Color and measurements same as in apterous summer vivipara except appendages which are darker with paler portions dusky and hairs somewhat shorter.

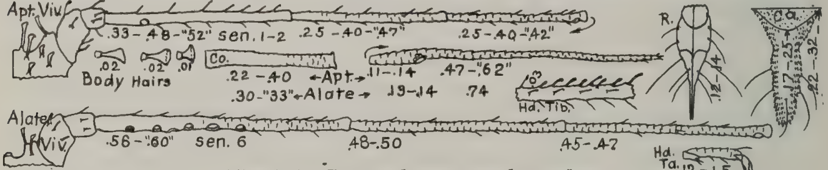

Fig. 321. *Capitophorus quadritrichus*

Collections. On *Artemisia tridentata.* Utah: Throughout state. Apterous viviparae May 17 to Aug. 26, alate viviparae June 9 and July 5; not rare.

Type and Paratypes. Knowlton Collection. Paratypes also in Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Pale green body and dark appendages, length of antenna (exceeding that of body), length of rostral IV+V (not exceeding .16), the short cornicle (shorter than IV or V). character of hairs on I and II (slightly globate, short and reclinate), needlelike tip of rostrum and spatulate cauda, bearing only 2 pairs of lateral hairs.

Capitophorus ribis (Linnaeus)

The Currant Aphid

Aphis ribis Linnaeus, 1758:451.
Myzus ribis, Gillette and Bragg, 1917b:338.
Capitophorus ribis, Theobald, 1926:229; Gillette and Palmer, 1934:155.

Apterous Summer Vivipara. Pale greenish yellow; cauda, anal plate and cornicle pale; antenna pale except tips of segments; tibiae pale to brownish. Body length 1.60-1.80; across eyes .44; hind tibia 1.40-1.55; hind tarsal II .10; antenna 2.60; rostrum obtuse, attaining 3d coxa. Hairs capitate with slender stalk and globate tip on vertex and body and on antennal I and II; merely blunt on III, IV and V, rather sparse; on hind tibia blunt. Ocular tubercle present. Lateral tubercles not evident. Cornicle slightly clavate, smooth. Cauda tapering, with 3 pairs of lateral hairs and one dorsal preapical one.

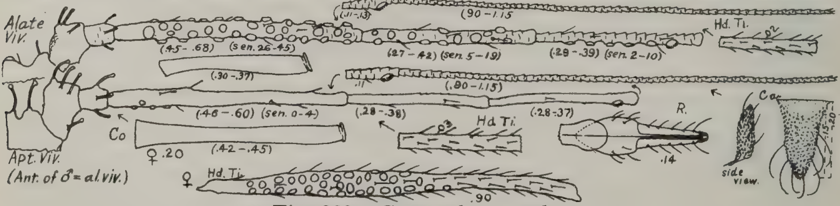

Fig. 322. *Capitophorus ribis*

Alate Vivipara. Head and thorax blackish; abdomen pale greenish yellow with dusky lateral areas and dorsal patch; antenna dusky; tibiae pale brownish with black tips; cauda, anal plate and cornicle pale. Measurements same as in apterous vivipara except as figured. Hairs blunt to slightly capitate on vertex, body and antennal I and II; blunt on III, IV and V and on hind tibia. Cauda .10 on median line.

Ovipara. Apterous. Pale greenish yellow to deep amber-yellow with all appendages pale to slightly dusky; tips of tibiae brownish, tarsi and tip of base of antennal VI blackish. Measurement about as in summer apterous vivipara or slightly smaller, except as follows: Cornicle .20; cauda .10 on median line and proximal two-thirds of hind tibia considerably swollen and bearing numerous large sensoria.

Male. Alate. Color, measurements and sensoriation of antenna same as in alate vivipara or slightly smaller and with dorsal patch more broken into bands; cornicle .20 and cauda .10 on median line.

Collections. On leaves of currant *(Ribes rubrum, R. aureum* and *R.* sp.) for winter hosts, causing puffed red blisters on the upper surface of the leaves; on leaves of *Stachys palustris* and *Leonurus cardiaca* as summer hosts. Throughout region. Apterous summer viviparae on winter host May and June, on summer host June 24 to Nov. 5; alate viviparae on winter host May 30 to July 29, on summer host June 24 to Nov. 11; oviparae on winter host Oct. 6; males on summer host Sept. 18 to Nov. 11, winter host Oct. 27 to Nov. 1; common.

Chief Distinguishing Characters. Deformation of the infested plant (blisters on leaves yellowish to reddish in color), clavate smooth cornicle, long capitate hairs on antennal I and II, rather long rostral IV+V (.14) bearing rather numerous short hairs, yellow body and sensoriation of antenna of male (same as in alate vivipara, even to the size of the sensoria).

Capitophorus rusticatus Knowlton and Smith

Capitophorus rusticatus Knowlton and Smith, 1937c:150.

Apterous Summer Vivipara. (Mounted on slide), body immaculate with brownish tinge; antenna beyond proximal half of III, entire cornicle, rostrum, femora except base, tarsi, knees and tips of tibiae black or blackish; cauda and anal plate pale to dusky. Body length "1.1"-1.3-"1.55"; across eyes .34-.38; antenna 1.20-1.60; hind tibia .60-.85; rostrum, in ventral aspect, with needlelike tip, attaining 3d coxa. Hairs narrow funnel-shaped on vertex and frontal tubercles, with occasional pointed one on the latter; broad funnel-shaped on body; blunt to pointed and sparse on antenna, same on hind tibia and rather numerous. Cornicle slightly clavate and sometimes bearing 1-2 slightly funnel-shaped hairs. Cauda tapering and bearing 2-3 pairs of lateral hairs and a single dorsal preapical one.

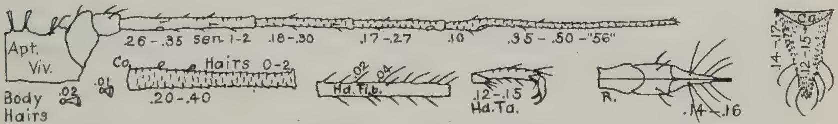

Fig. 323. *Capitophorus rusticatus*

Collections. On *Artemisia tridentata.* Idaho: Rexberg. Apterous viviparae July 14; apparently rare.

Type and Paratypes. Knowlton Collection. Paratypes also in Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Dark antenna and cornicle and rather pale cauda, shapes of the hairs (slender funnel-shaped on vertex with also 1-2 pointed ones on frontal tubercle and short broad funnel-shaped ones on dorsum of body), small size of body (about 1.30 and not over 1.55), shape and length of cornicle (slightly clavate and about the same length as III), cauda tapering, with not more than 3 lateral hairs, length of unguis (more than 4 times base of VI) and shape and length of rostral IV+V (with needlelike tip, .14-.15 long).

This species is almost indistinguishable from C. *pullus* but differs slightly in points 3, 6 and 7 above. Also the host plant differs. Further study as to limits of variation may prove the two forms to be the same species.

Capitophorus shepherdiae Gillette and Bragg

Capitophorus shepherdiae Gillette and Bragg, 1916:445; Gillette and Palmer, 1934:156.

Fundatrix. Color and measurements same as apterous summer vivipara except that antenna is rather shorter.

Apterous Summer Vivipara. Pale yellowish green to greenish yellow, with short transverse intersegmental dashes and spots of darker green; rostrum, cauda and anal plate pale; appendages and cornicle pale, becoming dusky distally. Body length 1.3-1.4; hind tibia .45-.50; hind tarsal II .08; antenna .65-.70, five-segmented; rostrum acute, tip rather needlelike, attaining between 2d and 3d coxae. Hairs conspicuously capitate, globate to slightly funnel-shaped and short-stalked, set on tubercles, quite numerous on dorsum, 3 dorsolateral and 1 lateral row; on vertex and body .04-.05 long including tubercle; capitate on antennal I, .015; blunt on remainder of antenna and on hind tibia. Cauda short and tapering to broadly spoon-shaped bearing 2 pairs of lateral hairs and 1 dorsal preapical one. Cornicle slightly clavate, nearly smooth.

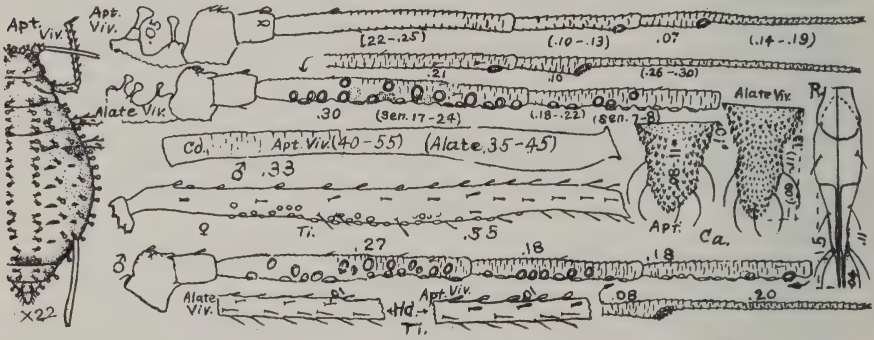

Fig. 324. *Capitophorus shepherdiae*

Alate Vivipara. Head and thorax dark brown to blackish; abdomen light green, with dusky markings on lateral areas, 3 on each side and a quadrate patch from III to center of VI; antenna, beyond base of III, blackish; cornicle dusky; cauda and anal plate greenish; legs pale greenish except tarsi and tips of tibiae which are dusky. Body 1.3-1.5; hind tibia .85; hind tarsal II .08-.09; antenna 1.1-1.2; rostrum attaining between 1st and 2d coxae. Hairs globate, on vertex; blunt on antennal I and II, and on hind tibia drooping and very sparse.

Ovipara. Apterous. Similar in color and measurements to apterous summer vivipara except that color is more yellow and hind tibia is slightly swollen for most of length and bearing about 14-30 small sensoria on ventral side.

Male. Alate. Color and measurements as in alate vivipara except as follows: Body length 1 and length of cornicle .33.

Collections. On leaves and twigs of *Elaeagnus angustifolia, Hippophae rhamnoides* and *Shepherdia argentea.* Colorado: Fort Collins and Laporte. Utah: Elsinore. Fundatrices April 25 to May 12, apterous summer viviparae June 16 to Oct. 23, alate viviparae June 4 to 19 and Sept. 16 to Oct. 8, sexuales Sept. 28 to Oct. 23; not rare. Found associated with C. *hippophaes,* C. *braggii,* and C. *xanthii.*

Type. U.S.N.M., No. 41938. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Short unguis (shorter than III or cornicle, in aptera hardly equal to half length of cornicle), clavate shape of cornicle, conspicuous and numerous short-stalked capitate hairs over entire dorsum, in aptera, short antenna (hardly longer than half of body in aptera), cauda not with acute tip and length of cornicle (shorter than .50 in alata and shorter than .60 in aptera).

Capitophorus spatulavillus Knowlton and Smith

Capitophorus spatulavillus Knowlton and Smith, 1936e:233.

Apterous Summer Vivipara. "Pale green, appearing white due to numerous fan-shaped hairs"; appendages pale with tarsi, tips of tibiae and of rostrum and antenna, beyond proximal half of IV, dusky to black. Length of body 1.4-1.7; across eyes .37-.41; hind tibia ".66"-.70-.90-"1"; antenna 1.60-"1.90"; rostrum attaining between 2d and 3d coxae. Hairs on vertex slender funnel-shaped and stalked; on body the same but shorter; on antenna, including I and II, blunt and minute and on tibiae apparently pointed, reclinate and inconspicuous. Cornicle slightly clavate to approximately cylindrical with somewhat oblique tip, sometimes both shapes occurring in same individual, as shown in figure. Cauda somewhat spatulate to parallel-sided, bearing 2 pairs of lateral hairs and a single dorsal preapical one.

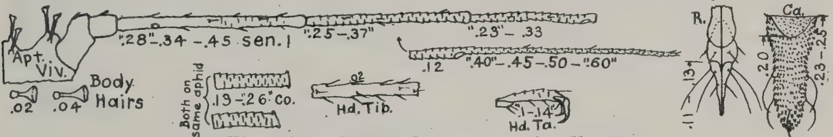

Fig. 325. *Capitophorus spatulavillus*

Collections. On *Artemisia tridentata* and *A.* sp. Utah: Dry Lake and Ash Creek. Idaho: Mink Creek. Apterous viviparae April 25 to Aug. 16; not common.

Chief Distinguishing Characters. Pale body and appendages, short cornicle (half to two-thirds of IV, third to half of distance across eyes), character of hairs (stalked funnel-shaped on vertex and body but merely blunt and minute on I and II and pointed on hind tibia), short antenna (not longer than body), length of III (never longer, usually shorter, than distance across eyes), cylindrical or nearly spatulate cauda with 2 pairs of lateral hairs and characters of rostral IV+V (.11-.12 in length and with ventrally needlelike tip).

Capitophorus sporadicus (Knowlton) n. comb.

Macrosiphum sporadicum Knowlton, 1935c:135.

*Fundatrix.** Differs from apterous summer vivipara only as follows: More robust body; antennal IV .48-.63, V .47-.64; cornicle .70-.75 and pointed hairs on body not evident. It is peculiar for the fundatrix to differ in so much shorter antennal IV and V but not III.

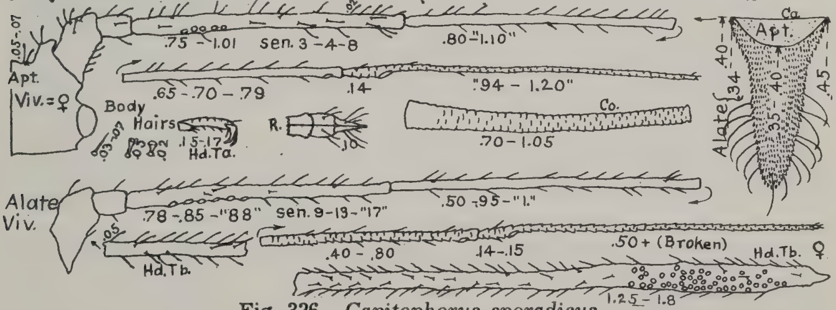

Fig. 326. *Capitophorus sporadicus*

Apterous Summer Vivipara. "Apple-green with heavy pruinose covering"; antenna beyond proximal third of III, distal two-thirds of tarsi and tips of tibiae and of rostrum blackish; anal plate and cauda slightly dusky to pale; tibiae pale. Body length 2.30-3; across eyes .53-.60; hind tibia 1.60-2.15-"2.34"; antenna 3.90-4.24, sensoria unusually small; rostrum acute attaining 2d coxa. Ocular tubercle rudimentary or lacking. Hairs slightly capitate on vertex, antenna and hind tibia; on body funnel-shaped, also often with a few scattered blunt to pointed hairs. Cornicle slender, slightly clavate and imbricated. Cauda rather stout, tapering beyond slight neck, with blunt tip and bearing 5-7 lateral and dorsolateral hairs on each side and a single preapical one.

*There is only a strong probability that these specimens are fundatrices of this species; it has not yet been biologically proven.

Alate Vivipara. Color about as in apterous vivipara except as follows: Thorax brownish; antenna beyond proximal fifth of III and distal two-thirds to entire cornicle blackish. Body length 2-2.50; across eyes .53; hind tibia 1.80-2.10. Otherwise same as apterous vivipara except as figured.

Ovipara. Apterous. "Reddish tan and whitish pruinose." Otherwise about as in apterous vivipara except that nearly proximal half of hind tibia is swollen and covered with sensoria and cauda and cornicle are slightly shorter.

Collections. On leaves and stems of *Chrysothamnus nauseosus* subsp. *nauseosus.* Utah: Brigham Canyon, Logan, Honeyville, Harper, Butlerville, Promontory, Cedar Valley, Dunbar and Deweyville. Idaho: Preston. Fundatrices May 29, apterous summer viviparae "May to mid-October," alate viviparae July 21 to Sept. 27, oviparae Oct. 3; apparently rather common.

Type and Paratypes. Knowlton Collection. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Slightly capitate hairs on the vertex of both alata and aptera and body of alate vivipara, with rather sessile funnel-shaped ones on body of aptera and rather broad, somewhat spatulate cauda, bearing 6-7 hairs on each side.

Capitophorus utensis Pack and Knowlton

Capitophorus utensus Pack and Knowlton, 1929:201; Knowlton and Smith 1936c:112.

Apterous Summer Vivipara. "Green." (Mounted on slide), immaculate with tibiae and cauda slightly dusky; cornicle, antenna, tarsi and tips of tibiae black. Body length 1.10-1.7-"1.9"; across eyes .40-.48; antenna about 2-2.25; hind tibia .77-.95; rostrum hardly attaining 2d coxa. Cornicle slightly clavate, tip oblique. Cauda tapering and blunt.

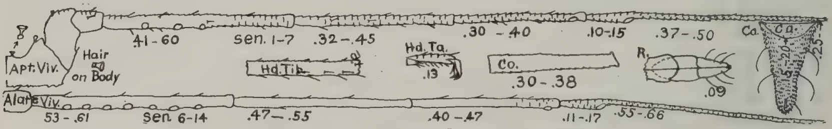

Fig. 327. *Capitophorus utensis*

Alate Vivipara. "Dark green with black lateral areas on abdomen; cornicle black; cauda pale; veins dusky." Body length 1.55-1.70; antenna 2.2-2.6; rostrum hardly attaining 2d coxa."

Collections. On *Gutierrezia sarothrae* and *Chrysothamnus viscidiflorus* subsp. *stenophyllus.* Utah: Throughout state. Idaho: Dayton. Apterous viviparae June 7 to Aug. 13, alate viviparae June 7 and 9; not very common.

Type. Knowlton Collection. Paratypes, U.S.N.M. and Utah Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Minute infundibulate hairs on vertex and body, hairs of the cauda which consist of only 2 lateral hairs and a single slenderly spatulate preapical hair, black cornicle and blunt, broad rostral IV+V.

Capitophorus wasatchii Knowlton

Capitophorus wasatchii Knowlton, 1927d:238 and 1936c:112; Gillette and Palmer, 1934:157.

Apterous Summer Vivipara. Pale green, appearing frosted due to capitate hairs; antenna dusky distally, often all beyond II; cauda, cornicle and legs pale to slightly dusky with tarsi black and tips of tibiae dark. Body length 1.75-2; across eyes .47-.50; hind tibia .95-1.05; hind tarsal II .13-.14; antenna 2.40-2.70; rostrum acute but not needlelike at tip, surpassing 2d coxa. Hairs on vertex funnel-shaped with slight shaft, on dorsum of body sessile, .02-.03 long and numerous; on antenna and hind tibia blunt to slightly capitate; on venter of abdomen mostly simple.

Alate Vivipara. (Mounted on slide), body immaculate; color of appendages as in apterous vivipara. Body length 1.80; antenna 2.80; hind tibia 1.20. Hairs as in aptera or slightly shorter.

Ovipara. Apterous. Color and measurements as in apterous vivipara except that some examples are brown and proximal half of hind tibia is more or less swollen and bearing rather numerous moderately large sensoria.

Male. Alate. Antennal measurements about as in apterous ovipara and vivipara.

Collections. On leaves of *Artemisia aromatica, Chrysothamnus nauseosus* subspp. *graveolens* and *typicus, Gaertneria tomentosa* and *Liatris punctata,* also a collection of oviparae on *Mentzelia oligosperma* and *Ambrosia artemisiaefolia* structurally inseparable from this species. Colorado: Bellvue, Laporte, Boulder, Sand Creek Pass and Fort Collins. Utah: Throughout northern part of state. Apterous summer viviparae May 20 to Oct. 14, alate viviparae May 22 to June 24, sexuales Oct. 8 to 14; rather common, but difficult to detect.

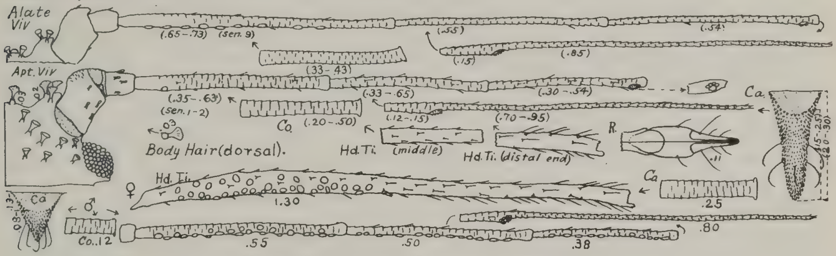

Fig. 328. *Capitophorus wasatchii*

Cotypes. U.S.N.M. and Knowlton Collection.

Chief Distinguishing Characters. Absence of distinct stalk in hairs on body and vertex, relatively short cornicle (shorter than III), rather long cauda (longer than base of VI) with rounded tip, tip of rostrum acute but not needlelike and cauda without spatulate hairs and with not more than 2 pairs of lateral hairs.

This species differs from the original description in the darker antenna (dusky usually from base of III instead of from middle of IV or only slight brownish distally on III).

Capitophorus xanthii (Oestlund)

Siphocoryne xanthii Oestlund, 1886:36 and 1887:71.
Capitophorus xanthii, Knowlton, 1927d:238.

Apterous Summer Vivipara. Pale greenish yellow with broken bands and dashes of grass-green; cornicle, cauda and appendages pale to slightly dusky. Body length 1.7-2; hind tibia .80-.90; hind tarsal II .10; antenna 1.05-1.25; rostrum in ventral aspect, with needle-shaped tip, attaining 2d coxa. Hairs capitate or slightly funnel-shaped at tip, with slender stalk on vertex; sessile on antennal I and II; hardly visible on remaining segments; on hind tibia capitate to blunt; on body anterior to abdominal VII .02-.03 and funnel-shaped without stalk, not numerous or conspicuous; on abdominal VII and VIII funnel-shaped with stalk and .02-.03 long, rather numerous and noticeable. Cornicle swollen in distal half to twice as wide as narrowest part and smooth. Cauda tapering, with slightly constricted tip and bearing two pairs of lateral hairs and rarely a dorsal preapical one.

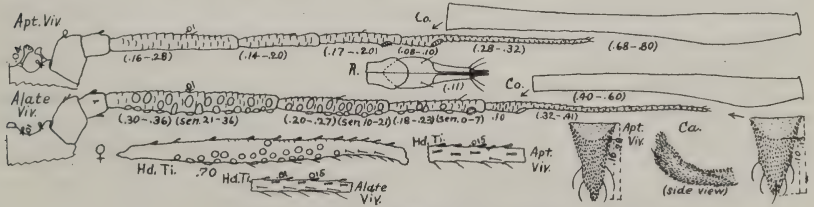

Fig. 329. *Capitophorus xanthii*

Alate Vivipara. Nymph. In autumn, light greenish yellow with conspicuous red dorsal blotch. *Adult.* Head and thoracic lobes brown; prothorax and abdomen pale greenish yellow to sulfur-yellow, with grass-green to dusky green dorsal bands on III, IV and V; antenna dark throughout, lighter on I and II; cornicle pale sordid; legs, anal plate and cauda pale yellowish; tarsi and tips of tibiae blackish. Body length .95-1.50; hind tibia .85-.97; antenna

1.20-1.50; rostrum attaining nearly to 2d coxa. Hairs very slightly capitate on vertex, body, antenna and hind tibia. Ocular tubercle small. Lateral tubercles absent.

Ovipara. Apterous. Reddish yellow or pinkish cinnamon mottled with light yellow and marked with green on narrow dorsolateral dashes on intersegmental lines and on lateral areas; appendages pale with tarsi, tips of tibiae, cauda, cornicle and base of antennal VI dusky. Body length 1.40-1.70; antenna .80, III partly coalesced with IV; hind tibia moderately swollen over most of length and bearing somewhat scattered rather large sensoria. Otherwise as in apterous summer vivipara.

Male. Alate. Head and thorax brown; abdomen yellow-clay with green markings on lateral areas on IV to VIII and with rusty brown dorsal patch on III, IV and V and paler bands on V and VI; legs brownish; antenna black. Body length 1.50 to 1.70; antenna 1.48, III, IV and V bearing numerous rather large sensoria.

Collections. On underside of leaves of *Xanthium orientale* as summer host and *Hippophae rhamnoides* as winter host. Throughout region. Apterous summer viviparae June 29 to Nov. 2 and alate viviparae June 22 to Sept. 29 on summer host, males on both hosts Aug. 21 to Oct. 5, oviparae on winter host Oct. 5; common.

Cotypes. Univ. of Minn. Collection.

This species is very similar to *C. shepherdiae* with which it is associated on the winter host but differs as follows: Longer unguis (longer than III and exceeding 3 times length of base of VI while in *shepherdiae* unguis is shorter than III and shorter than 3 times base of VI), longer cornicle (not shorter than .40 in alate or .68 in apterous vivipara) and more acute cauda with constricted tip.

Capitophorus xerozoous Knowlton and Smith

Capitophorus xerozoous Knowlton and Smith, 1936c:112.

Apterous Summer Vivipara. "Green"; (Mounted on slide); body immaculate; antenna beyond proximal two-thirds of III and cornicle beyond proximal half dusky; tarsi, tips of tibiae and of rostrum black; cauda and anal plate pale. Body length 1.7-2.5; across eyes .45-.50; antenna 3; hind tibia .90-1.12; rostrum attaining 2d coxa. Inconspicuous dorsal tubercles present on abdomen, one row on either side of median line. Hairs on body infundibulate and sessile, rather numerous.

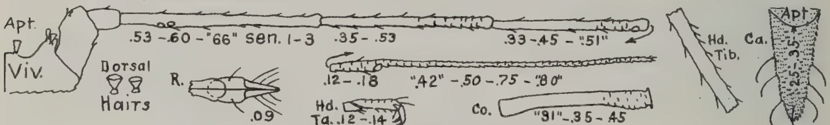

Fig. 330. *Capitophorus xerozoous*

Collections. On leaves of *Chrysothamnus nauseosus* subsp. *nauseosus, C. greeni, C. wyomingensis, C. parryi* and *C.* sp. Utah: Milford, Fillmore, Logan Canyon, Uinta and Tremonton. Idaho: Stone. Apterous viviparae May 6 to Sept. 23; apparently rare.

Type. C. F. Smith Collection. Paratypes, U.S.N.M., Knowlton and Colo. Agr. Exp. Sta. Collections.

This species is very similar to *C. gregarius* but differs as follows: Shorter cornicle (not longer than the base of VI), color of cornicle (not black), length of IV (distinctly shorter than III instead of about equal) and green body instead of brown.

Capitophorus zoomontanus Knowlton and Smith

Capitophorus zoomontanus Knowlton and Smith, 1936e:234.

Apterous Summer Vivipara. "Grayish green." (Mounted on slide), body immaculate with cornicle, cauda and appendages pale, except tarsi, tips of tibiae, of rostrum and of antenna which are dusky. Body length 1.5-2-"2.30"; across eyes .50-.55; antenna 3.08-4; hind tibia 1.40-1.75; rostrum attaining between 2d and 3d coxae. Hairs funnel-shaped, nearly sessile, on vertex and body; on antennal I and II slightly globate and minute; on III blunt, minute and sparse; on hind tibia, pointed, reclinate and inconspicuous. Cornicle very slightly clavate, at least oblique at tip. Cauda tapering to blunt tip with slight constriction near base. Frontal tubercles Macrosiphum-like.

Collections. On *Artemisia tridentata* and *A.* sp. Utah: Wolf Creek and Daniels Canyons. Idaho: Montpelier and Geneva. Wyoming: Moran. Apterous viviparae July 19 to Aug. 16; not common.

Type. Knowlton Collection. Paratypes, U.S.N.M.

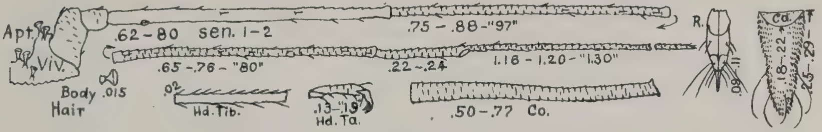

Fig. 331. *Capitophorus zoomontanus*.

Chief Distinguishing Characters. Pale body, shape of hairs (blunt and minute on I and II, slightly stalked, nearly sessile, funnel-shaped on vertex, the same on body but sessile and minute), Macrosiphumlike frontal tubercles, moderately long cornicle (about same length as V and longer than distance across eyes), rather broad, short cauda (length on median line shorter than third length of cornicle) bearing 2 pairs of lateral hairs and short rostral IV+V with needlelike tip.

Genus **Kakimia** Hottes and Frison

Myzus (Kakimia) Hottes and Frison, 1931a:344.
Kakimia, Gillette and Palmer, 1934:159.

Characters. Vertex pronouncedly convex; frontal tubercles moderately developed, but hardly exceeding vertex, rather Aphislike. Antenna six-segmented, as long or longer than body; secondary sensoria subcircular, numerous and more or less tuberculate on III and often also on IV and V in alate vivipara. Hairs slightly but not conspicuously capitate; on antenna and hind tibia length coequal with diameter of segment bearing them, rather numerous. Cornicle cylindrical or subvasiform. Cauda medium in size usually with slight constriction but sometimes tapering, rather Myzuslike. Lateral tubercles inconspicuous. Ocular tubercle present. Fore wing with media twice-branched; hind wing with both media and cubitus present.

Genotype (monotypical), *Myzus (Kakimia) thomasi* Hottes and Frison.

Key to Species of Kakimia

1.	Hind tarsal II as long as cauda	2
....	Hind tarsal II shorter than cauda	3
2.	Hind tarsal II longer than twice length of rostral IV+V (p. 284)	*tutigula*
....	Hind tarsal II shorter than twice length of rostral IV+V (p. 285)	*wahinkae*
3.	Hind tarsal II longer than rostral IV+V; aptera dusky posteriorly (p. 281)	*purpurascens*
....	Hind tarsal II shorter than rostral IV+V; aptera not dusky posteriorly	4
4.	Cornicle at least 6 times as long as hind tarsal II (p. 280)	*polemonii*
....	Cornicle shorter than 6 times as long as hind tarsal II	5
5.	Cornicle 4 or more times length of hind tarsal II	6
....	Cornicle shorter than 4 times length hind tarsal II	8
6.	Hairs on III as long as diameter of III; sensoria absent on IV in alata and aptera	7
....	Hairs on III shorter than diameter of III; sensoria always present on IV in alata and sometimes in aptera (p. 283)	*takala*
7.	Cauda bearing only pointed hairs (p. 276)	*cerei*
....	Cauda bearing both pointed and capitate hairs (p. 282)	*ribe-utahensis*
8.	Cornicle bearing a few hairs (p. 281)	*potentillae*
....	Cornicle without hairs	9
9	Unguis shorter than 1.25 times III	10
....	Unguis longer than 1.25 times III	12

10. Unguis not longer than .40 (p. 284) .... *utahensis*
.... Unguis longer than .40 11
11. Unguis in alata .44-.58; rostral IV+V .13 long (p. 280) .... *houghtonensis*
.... Unguis in alata .55-.70; rostral IV+V .15 long (p. 277) .... *collomiae*
.... Unguis in alata .51-.63 (p. 279) .... *essigi*
12. Not on *Ribes* (p. 276) .... *alpina*
.... On *Ribes* 13
13. Aptera without sensoria on IV and V (p. 278) .... *cynosbati*
.... Aptera with sensoria on IV and V (p. 283) .... *thomasi*

Kakimia alpina (Gillette and Palmer)

Myzus alpinus Gillette and Palmer, 1928:18.
Kakimia alpina, Gillette and Palmer, 1934:160.

Apterous Fall Vivipara. Light green; appendages pale to brownish with tarsi, tips of antennal III and IV and entire VI blackish. Body length 1.90-2.20; across eyes .44-.47; hind tibia 1.10-1.60; hind tarsal II .11-.13; antenna 2-2.60, III .47-.60, IV .29-.42, V .30-.39, VI .11-.13+.65-.90, sensoria 5-13 on III; cornicle .25-.40; cauda .19 on median line, .24-.28 on side. Hairs slightly but distinctly capitate; on vertex .03-.04; on antennal III .02, on hind tibia and body .03-.04; in the two latter cases shorter than diameter of segment bearing them. Cornicle cylindrical to subvasiform, imbricated. Cauda rather spoon-shaped and Aphislike and bearing 2 pairs of lateral hairs and a single dorsal preapical one. Rostral IV+V .18, attaining 3d coxa.

Alate Vivipara. Head and thorax black; abdomen light to medium green with broken dorsal bands and lateral areas; antenna, cornicle and cauda black; legs dusky. Body length 1.50-2.25; across eyes .44; hind tibia 1.45-1.75; antenna 2.50, III .60-.62, IV .36-.43, V .35-.39, VI .11-.13+.75-.90, sensoria tuberculate, 30-45 on III, 9-15 on IV, 0-6 on V. Hairs blunt or slightly capitate; .02-.03 on vertex and antenna; on tibia and body .03-.04. Otherwise measurements as in apterous vivipara. Lateral tubercles present on prothorax and abdominal I to VI.

Collections. On leaves and stems of *Castilleia* sp., *Orthocarpus luteus* and *Pedicularis paysoniana.* Colorado: Pingree Park (alt. 9000 ft.) and Cameron Pass. Apterous summer viviparae Aug. 18 to 24, alate viviparae Aug. 18 to 26 (after this date all became alate), alate males Aug. 26; plentiful but difficult to find on account of position in leaf axils.

Type. U.S.N.M., No. 41469. Paratypes, Colo. Agr. Exp. Sta. Collection.

This form seems to differ from Colorado specimens determined as *K. cynosbati* only in host plants and habits. On the *Orthocarpus,* at least, only alate viviparae and alate males are found at the end of summer, suggesting the possibility of migrating to another host, possibly *Ribes.* However, attempts to transfer fall alatae to *Ribes* have not yet been successful. The *Ribes* leaves appeared to possess no attraction whatever. It accordingly seems best to leave the two forms stand as separate species for the present.

Kakimia cerei Gillette and Palmer

Kakimia cerei Gillette and Palmer, 1933:354 and 1934:161.

Alate Vivipara. Head and thorax brown; abdomen pale yellow or greenish without markings; cauda and cornicle pale to slightly dusky; antenna pale on I, II and base of III, dusky distally; tibiae dusky; tarsi and tips of tibiae black. Body length 1.80; across eyes .42; hind tibia 1.25-1.7; antenna 2.2, secondary sensoria somewhat tuberculate, scattered along entire III; rostrum attaining 3d coxa. Other characters as in apterous vivipara.

Apterous Summer Vivipara. Color same as in alate vivipara except that tibiae are pale. Body length 1.70-2; hind tibia 1.20-1.60; antenna 1.80-2.23. Hairs blunt to slightly capitate; on vertex, antenna, hind tibia and side of abdomen .03-.04 long and nearly erect. Cornicle cylindrical to subvasiform, imbricated, imbrications more or less denticulate. Cauda parallel-sided, with slight neck, bearing two pairs of lateral hairs and a single dorsal preapical one, distal hairs slightly capitate.

Ovipara. Apterous. Pale yellowish green; appendages pale except tarsi, tips of tibiae and antenna which are blackish. Body length 1.75-1.80; antenna 1.20-1.25; hind tibia with proximal half slightly swollen and covered with scattered sensoria. Otherwise as in apterous vivipara except that cauda is shorter and stouter.

Male. Alate. Same as alate vivipara except entire appendages black and antenna as figured.

Collections. On underside of terminal leaves of *Ribes inebrians* and *R.* sp. curling them tightly. Colorado: Estes Park, Cherokee Park, Boulder, Nederland, Poudre Canyon, Stove Prairie Hill (near Bellvue) and foothills near Fort Collins. Apterous summer viviparae June 30 to Sept. 23, alate viviparae June 16 and July 15, oviparae Sept. 23, males July 20 to Sept. 23.

Type. U.S.N.M., No. 49295. Paratypes, Colo. Agr. Exp. Sta. Collection.

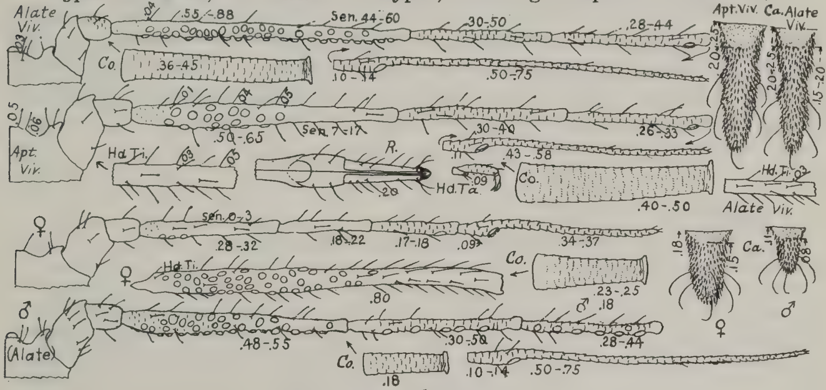

Fig. 332. *Kakimia cerei*

Chief Distinguishing Characters. Absence of sensoria on IV and V in alate vivipara, length of cornicle (in apterous vivipara .4-.5, almost as long as unguis; in alate vivipara .35-.45, longer than third of unguis), length of unguis (not longer than III) and absence of dorsal dusky markings in alate vivipara.

Kakimia collomiae Palmer

Kakimia collomiae **Palmer, 1936a:276 and 1936b:743.**

Apterous Fall Vivipara. Pale yellowish; cornicle, cauda and appendages pale except tips and tarsi which are brownish. Body length 1.2-2.1; across eyes .44; antenna 1.55-1.90; hind tibia .60-1.15; rostrum attaining abdominal I. Cornicle cylindrical, imbricated; cauda parallel-sided, spatulate, bearing 2-3 pairs of lateral hairs and a single preapical one. Hairs capitate, conspicuous; .04-.05 on side of body.

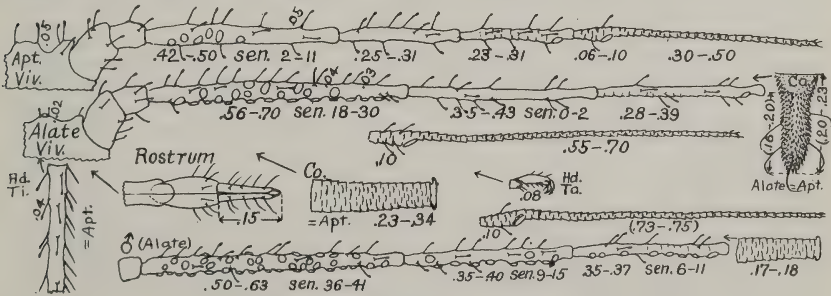

Fig. 333. *Kakimia collomiae*

Alate Vivipara. Head and thorax pale yellow-brown; abdomen pale yellowish; appendages, including cornicle and cauda pale; antenna beyond base of III, tarsi and tips of tibiae dusky. Body length 1.3-2; across eyes .44; antenna 1.95-2.5, secondary sensoria tuberculate and varying in size; hind tibia 1.2-1.38; rostrum attaining 2d coxa. Hairs capitate. Otherwise same as in apterous vivipara.

Male. Alate. Color as in alate vivipara. Body length 1.3; antenna 1.85-2.10; hind tibia 1.05.

Collections. On leaves of *Gilia linearis.* Colorado: Pingree Park and Rocky Mountain National Park. Wyoming: Centennial. Alate and apterous viviparae and alate males Aug. 21 to 26; very numerous, in crowded colonies causing yellowish unthrifty appearance of plant. Apparently leaving for a winter host as all nymphs were becoming winged.

Type. U.S.N.M., No. 51418. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Number of sensoria on III (in alate vivipara not over 30, in apterous vivipara not over 11), length of hind tarsal II (not over .08), length of unguis (not exceeding .65-.70 in alate vivipara, or .50 in apterous vivipara), length of cornicle (not exceeding .34 in alate or .30 in apterous vivipara) and length of rostral IV+V (not exceeding .15).

Kakimia cynosbati (Oestlund)

The Dogberry Aphid

Nectarophora cynosbati Oestlund, 1887:81.
Kakimia cynosbati, Gillette and Palmer, 1934:162; Knowlton and Allen, 1939:167.

Fundatrix. Color and measurements same as summer apterous vivipara except as follows: Antenna 1.60-2, III often partly coalesced with IV.

Apterous Summer Vivipara. Yellow to pale or medium green, paler on head; cornicle, cauda and appendages pale, with tarsi, tips of tibiae and of antennal segments dark. Body length 1.50-3.10; hind tibia 1.15-1.70; hind tarsal II .09-.12; antenna 2-3; rostrum attaining 3d coxa. Hairs slightly capitate; on hind tibia .025-.045; on side of body .03-.04. Cornicle cylindrical, imbricated; cauda tapering or parallel-sided with slight neck, bearing 2 pairs of lateral hairs and a single dorsal preapical one. Lateral tubercles present on all abdominal segments.

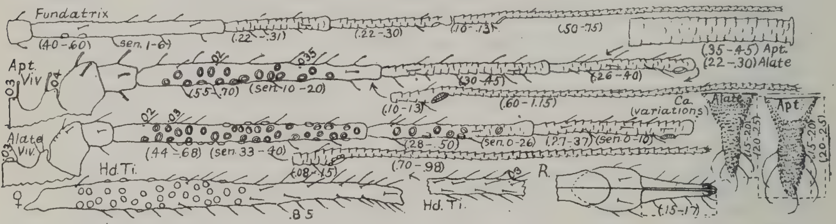

Fig. 334. *Kakimia cynosbati*

Alate Vivipara. Head and thorax black; abdomen pale green, immaculate or with dorsal speckles, but usually with dusky to black lateral areas and dorsal bands, which may be coalesced into a solid patch on III, IV and V; appendages, except base of antennal III, dusky to black; cornicle and cauda pale. Measurements as in apterous vivipara.

Ovipara. Apterous. Pale yellow; all appendages pale with tarsi and tips of tibiae and of antennal V and tip or entire base of VI black. Body length about 1.50; antenna 1.66, III .30-.37, IV .23-.29, V .23-.27, VI .10+.45-.80, sensoria 1-8 on III; cornicle .25-.38; hind tibia with proximal three-fifths swollen to about twice diameter of narrowest portion and bearing rather numerous sensoria.

Male. Alate. (Mounted in balsam), dusky portions and measurements same as in alate vivipara. Secondary sensoria numerous on III, IV and V.

Collections. On leaves of currant *(Ribes aureum, R. inerme,* occasionally *R. sanguineum)* and gooseberry *(R. grossularia).* Colorado: Gould, Cameron Pass, Cherokee Park, Log Cabin (west of Livermore), Rocky Mountain National Park, Idaho Springs, Mesa Lake and Fort Collins. Utah: Mount Timpanogos and south of Woodruff. Fundatrices April 14 to May 15, apterous summer viviparae May 15 to Oct. 25, alate viviparae April 23 to Nov. 1, sexuales Sept. 18 to Nov. 1; common.

Cotypes. Univ. of Minn. Collection.

This species differs from Oestlund's description and metatypes in the usual presence of dorsal dusky markings on abdomen of alate viviparae in all months during which collections were made. Specimens sent Oestlund were determined by him as his species with the suggestion that the markings might represent varieties. Our specimens were taken mostly on *R. aureum* and his on *R. cynosbati.*

Considerable variation in different characters exists in the Rocky Mountain form alone but repeated attempts, with about 200 specimens, to separate it into 2 or more species have failed, due to lack of corellation between the variations of the different characters as well as to the gradual intergrading of intensity of characters. No definite lines of distinction could be drawn so the group is tentatively left as one variable species. It is here placed under *cynosbati* on account of occasional specimens which agree with Oestlund's type specimens. If the Rocky Mountain form is specifically distinct it should perhaps be placed under *K. alpina,* but biological evidence of acceptance of the same hosts has not yet been obtained.

Kakimia essigi (Gillette and Palmer)

The Black-backed Columbine Aphid

Myzus aquilegiae Essig, 1917:314 (preoccupied); Knowlton, 1929b:10.
Myzus essigi Gillette and Palmer, 1929a:30 (new name for *M. aquilegiae* Essig).

Apterous Summer Vivipara. Pale yellow-green to straw-yellow with patch of shining black on entire dorsum of abdominal I to V and on median portion of V and usually with broken dashes on remaining abdominal segments; appendages pale. Body length 1.70-2.5; hind tibia 1.6-2; antenna 2.10-2.5; rostrum attaining 3d coxa. Hairs slightly capitate; on side of body .04. Cornicle cylindrical, imbricated. Cauda tapering, bearing 2 pairs of lateral hairs and a single dorsal preapical one.

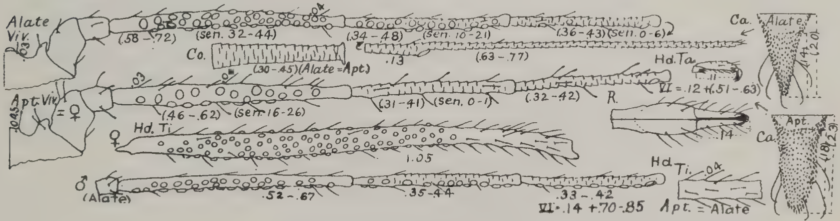

Fig. 335. *Kakimia essigi*

Alate Vivipara. Head and thorax blackish; abdomen pale yellow-green to straw-yellow with lateral areas and dorsal speckles and broken dorsal patch black; antenna dusky except base of III; other appendages pale. Measurements as in apterous vivipara. Hairs slightly capitate or blunt; not evident on body.

Ovipara. Apterous. Body length 1.70; antenna and cornicle as in apterous summer vivipara; hind tibia 1.05, proximal two-thirds swollen slightly and bearing numerous, small sensoria.

Male. Alate. Color about as in alate vivipara except appendages somewhat darker. Body length 1.50-1.70; antenna 2-3; cornicle .25; hind tibia 1.25-1.50.

Collections. On leaves of *Aquilegia coerulea* and *A. rubicunda.* Colorado: Longmont, near Cameron Pass, Pingree Park, Boulder, Fort Collins and nearby foothills. Utah: Monte Cristo and Vernon Canyon. Alate and apterous viviparae June 12 to Nov. 29, sexuales Oct. 3 to Nov. 29; common.

Cotypes. Essig and Colo. Agr. Exp. Sta. Collections.

Chief Distinguishing Characters. Conspicuous dorsal patch on abdomen especially of apterous vivipara, length of cornicle (2-3 times rostral IV+V), length of hind tarsal II (shorter than rostral IV+V) and length of unguis (slightly exceeding length of III).

Kakimia houghtonensis (Troop)

Gooseberry Witch-broom Aphid

Aphis houghtonensis Troop, 1906:59; Baker, 1919d:433 (desc. of all forms).
Myzus houghtonensis, Davis, 1919:232 and Plate 20 (drawing from type).
Myzus (Kakimia) houghtonensis, Hottes and Frison, 1931a:338 (lectotype selected).
Kakimia houghtonensis, Gillette and Palmer, 1934:164; Knowlton and Allen, 1939:168.

Apterous Summer Vivipara. Pale yellow-green to straw-yellow; all appendages pale. Body length 1.3-1.7; hind tibia .85-.90; hind tarsal II .08; antenna 1.2-1.6; rostrum attaining 3d coxa. Hairs slightly capitate; on side of abdomen .05. Cornicle cylindrical to subvasiform, imbricated. Cauda parallel-sided to slightly spatulate, bearing 2 pairs of lateral hairs and one dorsal preapical one.

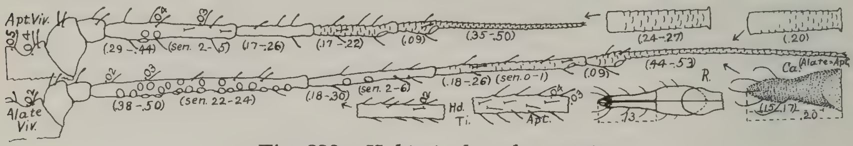

Fig. 336. *Kakimia houghtonensis*

Alate Vivipara. Head and thorax brown; abdomen pale green; antenna slightly dusky throughout; tibiae, cornicle and cauda pale. Measurements as in apterous vivipara except rostrum attaining only to 2d coxa. Hairs slightly capitate or blunt; on body .03; .02-.03 on antennal III; on hind tibia pointed.

Collections. On terminal leaves of *Ribes grossularia,* curling them tightly. Colorado: Fort Collins. Utah: Logan. Apterous summer viviparae May 21 to Aug. 21, alate viviparae May 21 and June 20; rare.

Lectotype. (Slide selected by Hottes and Frison) U.S.N.M.

Chief Distinguishing Characters. Distortion of host plant (tightly curled leaves), relatively short unguis (shorter than 1.5 times III), small number of sensoria on III (not more than 8 in aptera or 26 in alate vivipara), rather short rostral IV+V (not longer than .15) and short cornicle (not longer than .28 in apterous or .25 in alate vivipara).

Kakimia polemonii (Gillette and Palmer)

(Plate IV, 5-6)

Myzus polemonii Gillette and Palmer, 1929b:471.
Kakimia polemonii, Gillette and Palmer, 1934:165.

Apterous Summer Vivipara. Body length 3; hind tibia 2; hind tarsal II .09-.10; antenna 2.90. Hairs slightly capitate; on body .05-.06 and fairly numerous; on antenna and hind tibia similar. Other characters as in alate vivipara.

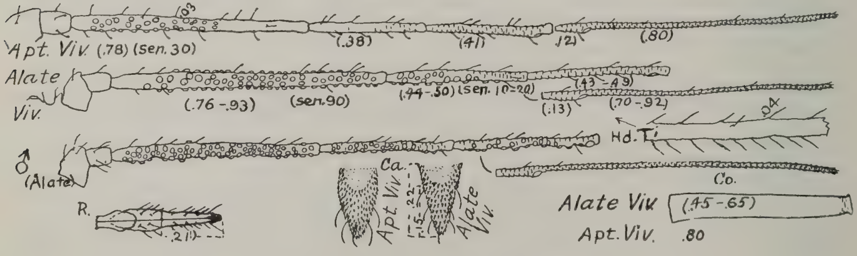

Fig. 337. *Kakimia polemonii*

Alate Vivipara. Head and thorax dark brown to black; abdomen light to medium green, darker on dorsomedian portion; cauda and cornicle pale; antenna black throughout; legs brownish. Body length 2.60; hind tibia 2; antenna 3.60, sensoria tuberculate; rostrum attaining 2d coxa. Hairs slightly capitate; .025-.03 on body. Cornicle cylindrical to slightly swollen on distal half, faintly imbricated. Cauda tapering, bearing 2-3 pairs of lateral hairs and a single dorsal preapical one.

Male. Alate. Head and thorax dark; abdomen reddish brown with large area of honey-yellow surrounding cornicle base; antenna dusky to black; cornicle, cauda and tibia pale. Body length 2; hind tibia 1.70; antenna 3. Otherwise as in alate vivipara.

Collections. On leaves of *Polemonium speciosum.* Colorado: Cherokee Park, Rocky Mountain National Park and Glen Haven. Apterous summer viviparae (very scarce) Sept. 20, alate viviparae June 26, Aug. 4 and Sept. 20, males Sept. 20; abundant when occurring.

Type. U.S.N.M., No. 41920. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Numerous tuberculate sensoria on III in viviparae both aptera and alata, long rostral IV+V, long unguis (not markedly shorter than III), and relatively long cornicle (longer than antennal IV).

Kakimia potentillae (Williams)

Myzus potentillae Williams, 1910:65; Davis, 1911b:23.
Kakimia potentillae, Gillette and Palmer, 1934:165.

Apterous Summer Vivipara. Yellowish green to amber-yellow; shining; antenna beyond base of III dusky; legs sordid, with tarsi and tips of tibiae blackish; cornicle and cauda pale. Body length 1.80-1.90; hind tibia 1.05-1.35; antenna 1.6-2.4; rostrum atttaining 3d coxa. Hairs slightly capitate; on side of body .05-.06. Cornicle cylindrical or tapering, imbricated and bearing from 1-3 hairs. Cauda tapering, bearing 2 pairs of lateral hairs and a single dorsal preapical one.

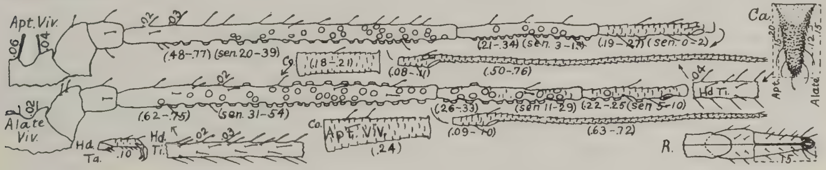

Fig. 338. *Kakimia potentillae*

Alate Vivipara. Head and prothorax sordid yellow; thoracic lobes yellow-brown; abdomen greenish yellow to lemon-yellow; shining; antenna dusky except base of III; legs pale brownish; cornicle and cauda pale; veins blackish and heavy. Measurements same as apterous vivipara except rostrum attaining only to 2d coxa and differences shown on figure. Hairs slightly capitate; on body .03-.04.

Collections. On leaves of *Potentilla* sp. Colorado: Log Cabin (west of Livermore) and foothills near Fort Collins. Apterous summer viviparae May 26 to Aug. 7, alate viviparae July 27 to Aug. 7; not common.

Cotypes. U.S.N.M., No. 376 and Univ. of Neb. Collection, Nos. 107 and 108.

Chief Distinguishing Characters. Presence of hairs on cornicle, length of cornicle (shorter than antennal IV), tuberculate sensoria on III, IV and V in alate vivipara and on III and IV in aptera, length of unguis (equalling III and length of rostral IV+V (exceeding hind tarsal II).

Kakimia purpurascens (Oestlund)

Nectarophora purpurascens Oestlund, 1887:81.
Macrosiphum purpurascens, Hottes and Frison, 1931a:318.
Kakimia purpurascens, Gillette and Palmer, 1934:166.

Fundatrix. Color and measurements same as in apterous vivipara except as follows: Antenna 1.40, III .35, bearing 1-2 sensoria, IV .24, V .22, VI .12+.30.

Apterous Summer Vivipara. Apple-green to yellowish green to pale olive-green; marked with brownish between cornicles, on median line of abdominal V, and dorsolaterally on III, IV, V and VI; antenna and cornicle slightly dusky, especially distally; cauda and legs pale. Body length 2-2.30; across eyes .47; hind tibia .95-1.35; hind tarsal II .13-.15; antenna 1.7-2.7; rostrum nearly attaining 2d coxa. Hairs slightly capitate; on side of body .01. Cornicle cylindrical or somewhat broader at base, imbricated. Cauda slender and tapering, bearing 4 pairs of lateral hairs and one or two dorsal preapical ones. Lateral tubercles rudimentary.

Alate Vivipara. Head and prothorax dusky green; thoracic lobes dark brown to blackish; abdomen light to dark olive-green, lightest on dorsum of abdominal III, IV and part of V, darker on median and posterior V and entire VI, VII and VIII; antenna beyond base of III and cornicle beyond base dusky; tibiae brownish, darker at knees and tips; tarsi blackish; cauda pale. Measurements as in apterous vivipara except as figured. Hairs slightly capitate and slightly shorter than in aptera.

Ovipara. Apterous. Color and measurements same as in apterous vivipara except hind tibia dark throughout and with proximal two-thirds slightly swollen and rather sparsely covered with scattered sensoria.

Male. Alate. Color similar to alate vivipara. Body length 1.60; cornicle .27-.32; cauda .10 on median line, .13 on side. Otherwise as in alate vivipara.

Egg. Newly laid, deep amber-yellow. Size .70 by .30.

Collections. On leaves of *Thalictrum* sp. Colorado: Fort Collins. Fundatrices May 20, apterous summer viviparae May 20 to June 29, alate viviparae June 16 to 28, sexuales June 29; not common.

Cotypes. Univ. of Minn. Collection.

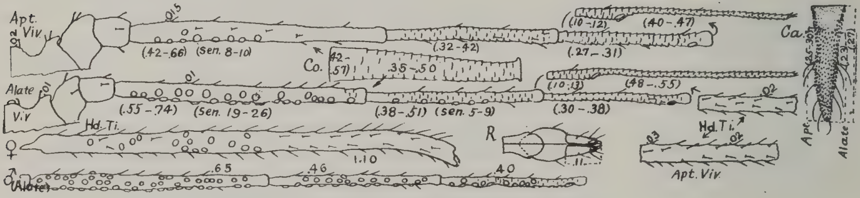

Fig. 339. *Kakimia purpurascens*

Chief Distinguishing Characters. Dark markings of posterior portion of abdomen, especially noticeable in aptera, slender elongate cauda bearing about 4 lateral pairs of hairs, broad short rostral IV+V (.11, shorter than hind tarsal II) and presence of sensoria on IV in alate vivipara.

Kakimia ribe-utahensis Knowlton

Kakimia ribe-utahensis Knowlton, 1935b:281; Knowlton and Allen, 1939:170.

Apterous Summer Vivipara. Body without dark markings; antenna beyond proximal two-thirds of II, tips of tibiae, and of cornicle and entire tarsi dusky; cauda and proximal parts of appendages pale. Body length 2.40-2.90; across eyes .50; hind tibia 1.47; hind tarsal II .09-.10; antennal III .70 with 12 sensoria, IV .35, V .41, VI .11+? (broken); cornicle .44, imbrications denticulate; rostral IV+V .16-.17, attaining 3d coxa; cauda, on median line, .26, bearing 2 pairs of lateral hairs and one preapical one, the proximal pair being pointed and the last three hairs capitate. Hairs capitate; on vertex .045, on antennal III .045 (length equal to diameter of III) on hind tibia .04-.045 (length equal to diameter of tibia); on body (side of abdomen) .04.

Alate Vivipara. Color as in apterous vivipara. Antenna 2.3, III .60 with about 38 sensoria, IV .37, V .34, VI .10+.64; hind tibia 1.47; hind tarsal II .11; cornicle .39; rostral IV+V .16, attaining 3d coxa; cauda with 2-3 pairs of lateral hairs and one preapical one. Hairs less distinctly capitate than in aptera but blunt or flattened at tip, and .03 on antennal III, hind tibia and side of abdomen.

Ovipara. Apterous. Body 1.5 by .88; hind tibia .53; hind tarsal II .06; antenna .90, III .18, IV .09, V .13, VI .07+.26; cornicle .17, imbrications denticulate; cauda .10, tapering, bearing 2 pairs of lateral hairs and one preapical one. Caudal hairs are pointed or blunt but not noticeably capitate. Rostral IV+V .11, attaining slightly beyond 2d coxa. Hairs on vertex, body and appendages blunt to slightly capitate and .03 long.

Collections. On "native black currant *(Ribes aureum).*" Utah: Cedar City. Alate and apterous summer viviparae and apterous oviparae July 8 and 18; apparently rare.

Type. Knowlton Collection.

This species apparently differs from *K. cerei* structurally, only in the slightly shorter rostral IV+V (.16-.17 instead of .17-.20) and the smaller ovipara (1.50 instead of 1.75-1.80). The three hairs on the tip of the cauda are distinctly capitate (those of *cerei* are either pointed or blunt hardly capitate). It differs in life cycle in the abundant presence of sexuales in July instead of September as in *cerei*. However, an alate male of the latter species was taken July 20, indicating the possibility of sexuales as early as in the former species although they have not yet been found in abundance. The species of host plant also differs. From *K. ribifolii* (Davidson) this species differs in length of rostral IV+V (longer than .14) and length of cornicle (longer than .27).

Drawings are hardly necessary because this species differs so little from *K. cerei*.

Kakimia takala (Hottes)

Dactynotus (Kakimia) takala Hottes, 1933:21.
Kakimia takala, Gillette and Palmer, 1934:166; Hottes, 1948a:32.

Apterous Summer Vivipara. Color same as alate vivipara. Body length 2-2.4; across eyes .48; hind tibia 1.1; antenna 1.6-2; rostrum attaining 3d coxa. Hairs slightly capitate; on side of body .04.

Cornicle cylindrical or slightly swollen on inner side near tip, faintly imbricated. Cauda slender parallel-sided, bearing 2 pairs of lateral hairs and single dorsal preapical one. Lateral tubercles present.

Alate Vivipara. Head and thorax dark; abdomen yellowish green; rostrum and tibiae light brown; cornicle, cauda and anal plate pale to dusky; antenna light dusky with base of III pale; tarsi and tips of tibiae dark; veins of wings dark and bordered. Measurements same as in apterous vivipara except as figured and antenna 1.8-2.24. Hairs slightly capitate; on body, vertex and hind tibia .03.

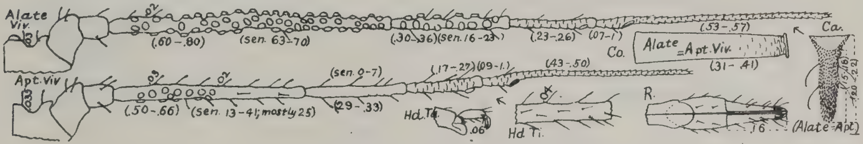

Fig. 340. *Kakimia takala*

Collections. On leaves of *Gilia aggregata*. Colorado: Whitewater, Boulder and Sunset (in Boulder Co.). Apterous and alate summer viviparae July 8 to Aug. 2; rare.

Type. U.S.N.M.

Chief Distinguishing Characters. Numerous highly tuberculate sensoria on III and IV of alate vivipara, frequent presence of sensoria on IV in apterous vivipara, short hind tarsal II (.06-.07, shorter than half of rostral IV+V) and rather short unguis (shorter than III).

[Genotype *Kakimia thomasi* (Hottes and Frison)]

Myzus (Kakimia) thomasi Hottes and Frison, 1931a:344.
Kakimia thomasi, Gillette and Palmer, 1934:160.

Apterous Vivipara. Light green, without markings; antenna beyond I and II light greenish yellow to brown, darker distally; tibiae, cornicle and cauda light yellowish or greenish or slightly dusky; tarsi and tips of tibiae brown. Body length 1.52; across eyes .38; hind tibia 1.4-1.50; hind tarsal II .09; antenna 2.30, III .55-.60, IV .35-.40, V 32-.35, VI .10-.12+.70-.85, secondary sensoria 23-34 on III, 5-7 on IV, 2-3 on V; cornicle subvasiform, .32 or equalling antennal IV; cauda slender and .20 long on median line, .25 on side, with neck and bearing 2 pairs of lateral hairs and one dorsal preapical one. Hairs spinelike; on antenna .03; on hind tibia .03-.04; on body .03.

Alate Vivipara. Head and thorax light brown; otherwise color and measurements about as in apterous vivipara except sensoria 38-48 on III, 22-23 on IV, 7-12 on V and hairs somewhat shorter. Small lateral tubercles present on each abdominal segment.

Host. On leaves of *Ribes sp.* (Not recorded from region.)

Type. Ill. Nat. Hist. Surv. Collection, No. 10715; morphotypes, No. 10706.

Data for description and figures obtained from examination of type specimens and description by Hottes and Frison (op. cit.).

Kakimia tutigula (Hottes)

Adactynus tutigula Hottes, 1933:17.
Kakimia tutigula, Gillette and Palmer, 1934:167; Hottes, 1949b:56.

Apterous Summer Vivipara. Body length 2.3-2.66; across eyes .56; hind tibia 1.8-2; antenna 2.5-3; rostrum attaining 2d coxa. Lateral tubercles present; inconspicuous [illegible] thorax, minute on abdomen. Hairs pointed to blunt hardly capitate; on side of body .05. Cornicle cylindrical or slightly swollen, subvasiform, imbricated. Cauda broad and tapering, bearing 2-3 pairs of lateral hairs and a single dorsal preapical one.

Alate Vivipara. Head and thorax brown, abdomen pale yellow green with dusky lateral areas and sometimes traces of dorsal bands; pulverulent; antenna dusky except base of III; tibiae and cornicle light brown; cauda and anal plate pale; tarsi and tips of tibiae and of rostrum blackish. Measurements same as in apterous vivipara. Hairs blunt; on body hardly evident except on posterior segments. Rostrum attaining halfway between 1st and 2d coxae.

Male. Alate. Head and thorax dark; abdomen "green," with dusky dorsal bands and lateral areas; antenna and cornicle light dusky; cauda and anal plate pale; tibiae and rostrum brownish with darker tips; tarsi black. Body length 2; hind tibiae 1.6; hind tarsal II .20; antenna about 3; cauda .07-.10 on median line, .12-.15 on side and bearing 2-3 pairs of lateral hairs and 1-2 preapical ones.

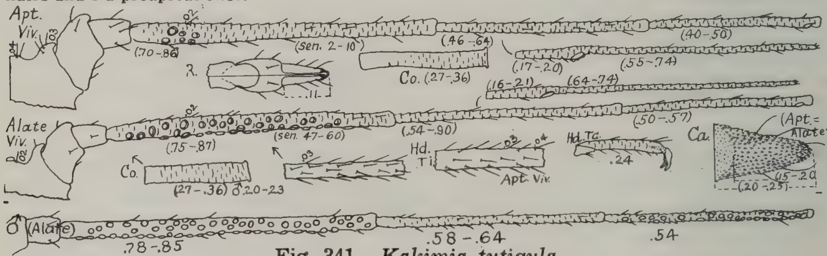

Fig. 341. *Kakimia tutigula*

Collections. On *Corydalis* sp. Colorado: Skyway and Grand Mesa. Alate and apterous viviparae July 26, alate viviparae July 26 and Sept. 10, males Sept. 10; apparently rare.

Type. U.S.N.M. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Long hind tarsal II (.24, as long or longer than cauda and exceeding twice the length of rostral IV+V), short rostral IV+V (.11, shorter than base of antennal VI) and long antennal IV (.46-.90, about twice the length of the cornicle).

Kakimia utahensis Knowlton

Kakimia utahensis Knowlton, 1943b:122.

Apterous Vivipara. (Cleared and mounted on slide), body pale without pigmented dorsal areas; antenna pale to dusky with VI and tips of IV and V darker; cornicle and cauda pale to dusky; rostrum, tarsi and tips of tibiae dark. Body length 1.2-1.34; across eyes .36-.42; hind tibia .90-1.2-"1.3"; hind tarsal II .07-.09; antenna about 1.55, III .43-.45, IV .28, V .25-.27, VI .10-.11+.35-.37, sensoria 7-11 on III; cornicle ".25"-.33; rostral IV+V .13-".16," slenderly obtuse, attaining 3d coxa. Cauda bearing 2-3 pairs of lateral hairs.

Alate Vivipara. General color pale; abdomen with darker lateral areas on I, II and III; cornicle, cauda, and appendages pale to dusky; antenna beyond base of III, tarsi and tips of tibiae darker. Body length 1.3-"1.44"; hind tibia "1.12-1.2"-1.35; hind tarsal II .08; antenna about 1.50, III .45, IV .20-".33", V .30, VI .12+unguis (broken), sensoria tuberculate, about 32 on III, "10"-14 on IV, 4 on V; cornicle .25-".35, lightly imbricated to wrinkled; cauda .20 long, bearing 2-3 pairs of lateral hairs."

Collections. On *Aquilegia rubicunda.* Utah: Vernon Canyon. Alate and apterous viviparae June 19; rare.

Type. Knowlton Collection.

Chief Distinguishing Characters. Length of cornicle (longer than .20 in alate and longer than .27 in apterous vivipara), number of sensoria on III (more than 24 in alate and more than 5 in apterous vivipara), length of unguis (shorter than .40), absence of a dark dorsal patch on apterous vivipara.

Kakimia wahinkae (Hottes)

The Green-bronze Larkspur Aphid

Dactynotus wahinkae Hottes, 1933:19.
Kakimia wahinkae, Gillette and Palmer, 1934:168; Hottes, 1949b:53.

Apterous Summer Vivipara. Color about as in alate vivipara. Body length 2.2-2.9; across eyes .50; hind tibia 1.7-2.2; rostrum surpassing 2d coxa. Hairs blunt; on side of body .08. Cornicle cylindrical or subvasiform, faintly imbricated. Cauda short and thick, spatulate, bearing 4 pairs of lateral hairs and a single dorsal preapical one.

Alate Vivipara. Head and thorax brown; abdomen shining green-bronze to dark green, with broken dorsal dashes and lateral areas dark; late fall forms occasionally bright reddish orange; rostrum and appendages except base of antennal III dusky to blackish; cornicle, cauda and anal plate slightly dusky. Body length 1.80-2.30; rostrum hardly attaining 2d coxa. Otherwise as in apterous vivipara except hairs on side of body .04 and as figured.

Ovipara. Apterous. (Mounted in balsam), rostrum and antenna brownish; cornicle and legs sordid yellow with tarsi and tips of tibiae blackish; cauda and anal plate dusky. Body length about 2; across eyes .50; antenna 1.80-2, III .45-.51, IV .25-.30, V .20-.25, VI .10-.12+.60-.68; hind tibia 1.4-1.5, moderately swollen on proximal half which portion bears numerous flat sensoria; cornicle .15-.18.

Male. Alate. Same as alate vivipara except as follows: Antennal III .60-.70, sensoria 42-48 on III, 9-14 on IV, 6-10 on V; cornicle .13-.15; hind tibia 1.45-1.60.

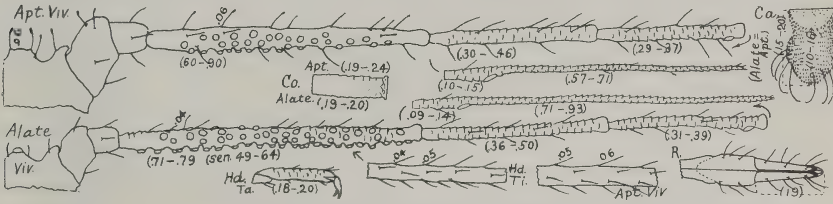

Fig. 342. *Kakimia wahinkae*

Collections. On *Delphinium occidentale* and *Aconitum columbianum.* Colorado: Grand Mesa, Skyway and Manassa. Wyoming: Laramie. Utah: Aspen Grove and Mount Timpanogos. Alate and apterous viviparae May 24 to Aug. 15, sexuales Aug. 11 to Sept. 13; rather rare.

Type. U.S.N.M. Paratypes, Colo. Agr. Exp. Sta. and Hottes Collections.

Chief Distinguishing Characters. Short, broad, spatulate cauda bearing 4 pairs of lateral hairs, long hind tarsal II (.18-.20, about as long as the cornicle), short cornicle (.19-.24) and long rostral IV+V (.19).

Genus **Macrosiphum** Passerini

Siphonophora Koch, 1855:150 (preoccupied).
Macrosiphum Passerini, 1860:27; Baker, 1920a:57.
Nectarophora Oestlund, 1887:78.
Illinoia Wilson, 1910a:318.

Characters. Vertex concave or but slightly convex at center. Frontal tubercles prominent, exceeding vertex, and diverging. Antenna six-segmented, as long or longer than body, unguis usually as long or longer than III. Sensoria on antenna subcircular, usually with narrow margins. Cornicle usually with reticulation, cylindrical, usually more than twice as long as rostral IV+V. Cauda twice as long as rostral IV+V (except *taraxaci),* tapering to parallel-sided or spatulate. Hairs blunt or slightly capitate at tip; on antenna and hind tibia not, or rarely, distinctly longer than diameter of segment bearing them. Anal plate rounded. Rostrum with V indistinct or vestigial. Lateral tubercles not evident. Ocular tubercle present. Fore wing with media twice-branched; hind wing with both media and cubitus present. Male usually alate; ovipara apterous. Living exposed on leaves and twigs of deciduous plants.

Genotype (set by Passerini in 1860), *Aphis rosae* Linnaeus.

The genus *Macrosiphum* is here used in the broad sense. The numerous genera into which the genus has been split by various authors are here regarded as possibly subgenera and no attempt has here been made to separate these groups or to designate which species would be included under each name.

The genus *Illinoia* Wilson which has been given rather wide usage is not based on a valid morphological distinction (see Gillette, 1927:347). The original description gives no distinguishing characters from those upon which *Macrosiphum* is based. The type species, *liriodendri* (Monell) shows no generic differences from *rosae* (Linnaeus); the figure by Baker (1920, pl. VIII, j) showing the cauda, the shape of which has been used as the chief distinguishing character, was drawn from an immature individual and is therefore erroneous and misleading.

Key to Species of Macrosiphum

1.	Cornicle not reticulated	2
....	Cornicle reticulated	10
2.	Cornicle longer than 1.5 times III especially in aptera (p. 314)	*macrosiphum*
....	Cornicle not distinctly longer than 1.5 times III	3
3.	Hind tarsal II shorter than base of VI	4
....	Hind tarsal II not distinctly shorter than base of VI	7
4.	Unguis longer than III; rostral IV+V .11 (p. 321)	*purshiae*
....	Unguis as above; rostral IV+V .15 (p. 324)	*sibiricum*
....	Unguis not longer than III	5
5.	Rostral IV+V longer than hind tarsal II; lateral hairs on cauda 7 or more pairs (p. 301)	*crenicornum*
....	Rostral IV+V not longer than hind tarsal II; lateral hairs on cauda fewer than 7 pairs	6
6.	Cornicle shorter than 5 times hind tarsal II (p. 330)	*wasintae*
....	Cornicle longer than 5 times hind tarsal II (p. 320)	*pisi*
7.	Unguis longer than 5 times base of VI	8
....	Unguis not longer than 5 times base of VI; sensoria 18 or more on III of alata; rostral IV+V not hairy (p. 302)	*dirhodum*
....	Unguis as above; sensoria on III of alata fewer than 18; rostrum hairy (p. 295)	*barri*
8.	Cornicle shorter than 6 times length of rostral IV+V	9
....	Cornicle longer than 6 times length of rostral IV+V (p. 324)	*sibiricum*
9.	Unguis 1.25-1.6 times length of III (p. 319)	*pelargonii*
....	Unguis .80-1.16 times length of III (p. 333)	*zerozalphum*
10.	Cornicle with not more than about 4 rows of reticulations	11
....	Cornicle with more than 4 rows of reticulations	13
11.	Rostrum with needlelike tip; unguis shorter than cornicle (p. 332)	*zerohypsi**
....	Rostrum ending in needlelike point; unguis shorter than twice length of cornicle (p. 293)	*artemisiphilum**
....	Rostrum with needlelike tip; unguis coequal with twice length of cornicle (p. 306)	*flavilum**
....	Rostrum obtuse	12
12.	Unguis length about 3 times cornicle (p. 318)	*niwanistum*
....	Unguis 1.3-1.4 times cornicle (p. 324)	*sibiricum*
....	Unguis length not longer than cornicle (p. 342)	*Myzus porosus*
13.	Rostrum acute, may end in needlelike point	14
....	Rostrum obtuse	21
14.	Cornicle longer than IV	15
....	Cornicle not longer than IV	16
15.	Unguis longer than cornicle; cornicle not shorter than .55 (p. 300)	*coweni**
....	Unguis as above; cornicle shorter than .55	15a
....	Unguis not longer than cornicle; cornicle .43-.50 (p. 292)	*anomellum**
....	Unguis as above; cornicle .47-.59 (p. 297)	*cefsmithi**
....	Unguis as above; cornicle .60-.80 (p. 305)	*filifoliae**
15a.	III shorter than .60 (p. 332)	*zerothermum**
....	III .57-.69 (p. 297)	*cefsmithi**
....	III .62-.66 (p. 290)	*albicornum**

16. Sensoria on III in aptera, more than 10, on III of alata more than 20........17
.... Sensoria on III in aptera fewer than 10, on III of alata fewer than 20........18
17. Unguis shorter than III (p. 306)........*frigidae**
.... Unguis not shorter than III; cornicle longer than cauda (p. 313)........*ludovicianae*
.... Unguis as above; cornicle not longer than cauda (p. 323)........*sanborni*
18. Unguis longer than 5 times base of VI; cornicle of alata shorter than .40, of aptera shorter than .45 (p. 311)........*jonesi**
.... Unguis as above; cornicle at least .40 in alata, .45 in aptera (p. 305)........*essigi**
.... Unguis shorter than 5 times base of VI........19
19. Cornicle 1-1.5 times length of base of VI (p. 307)........*frigidicola*
.... Cornicle longer than 1.5 times base of VI........20
20. Cornicle twice as long as base of VI (p. 293)........*artemisivulgaris*
.... Cornicle three times as long as base of VI (p. 293)........*artemisiphilum**
21. Cornicle not longer than third of III (p. 326)........*sonchellum*
.... IV longer than third of III........22
22. Cornicle longer than 4 times hind tarsal II........23
.... Cornicle not distinctly longer than 4 times hind tarsal II........49
23. Cornicle distinctly longer than III........24
.... Cornicle not distinctly longer than III........37
24. Sensoria on III of alata not in single row........25
.... Sensoria on III of alata in single row........26
25. Sensoria on III in aptera more than 8, in alata more than 17........32
.... Sensoria on III in aptera 1-8, in alata 8-15 (p. 303)........*eoessigi*
26. Base of VI twice as long as hind tarsal II (p. 243)........*Amph. stanleyi*
.... Base of VI shorter than twice length of hind tarsal II........27
27. Body dark brown to bluish or reddish (p. 312)........*kiowanepum*
.... Body green........28
28. Antenna longer than body........29
.... Antenna not longer than body (p. 316)........*mentzeliae*
29. Reticulated area on cornicle about the same length as base of VI........30
.... Reticulated area on cornicle distinctly shorter than base of VI........31
30. Cornicle black (p. 320)........*pseudorosae*
.... Cornicle not black, longer than 1.2 on *Rudbeckia* (p. 298)........*cockerelli*
.... As above. On *Corallorhiza* (p. 299)........*corallorhizae*
.... Cornicle not black, shorter than 1.2 (p. 324)........*solanifolii*
31. Reticulated area on cornicle hardly longer than half of base of VI (p. 296)........*californicum*
.... Reticulated area on cornicle distinctly longer than half of base of VI; sensoria on III of alata at least 14; cornicle not longer than 1.3 (p. 300)........*creelii*
.... As above except cornicle longer than 1.3 (p. 298)........*cockerelli*
.... Reticulated area as above; sensoria on III of alata fewer than 14 (p. 322)........*rudbeckiarum*
32. Reticulated area on cornicle never distinctly exceeding tenth of cornicle length........33
.... Reticulated area on cornicle distinctly exceeding tenth of cornicle length........34
33. Cornicle and antenna black (p. 321)........*rosae*
.... Cornicle and antenna not black (p. 329)........*timpanogos*
34. Rostral IV+V .23-.25 long, much longer than hind tarsal II (p. 313)........*longirostris*
.... Rostral IV+V not longer than .15, about same length as hind tarsal II or longer........35
35. Sensoria present on IV in alata; cauda with 2-3 pairs of lateral hairs (p. 334)........*zymozionensis*
.... Sensoria absent on IV in all viviparae........36
36. Reticulated area on cornicle extending hardly twice length of rostral IV+V; cornicle 4-6 times length of rostral IV+V (p. 304)........*erigeronensis*
and (p. 304)........*escalantii*

**M. coweni, cefsmithi, filifoliae, jonesi, essigi, artemisiphilum, frigidae, albicornum, anomellum, flavilum, zerohypsi* and *zerothermum* form a complex in which the species so merge together that separation into species is very difficult and even doubtful in some cases. Since they all occur on the same species of host plant it may be that all belong to one or two very variable species but the range of measurements is so great that it seems inadvisable to so treat them, especially since the range of measurements given for each species is usually fairly uniform for the individuals of the same colony. Occasional individuals which differ from the others in the colony are presumably, but not certainly, strays from another species. Biological work is needed to settle the status of these forms.

.... Reticulated area on cornicle not longer than rostral IV+V (p. 295) .... *bonitum*
.... Reticulated area on cornicle 2-3 times length of rostral IV+V; cornicle 8 times length of rostral IV+V (p. 311) .... *katonkae*
37. Cauda especially in aptera longer than half of cornicle 38
.... Cauda shorter than half of cornicle 42
.... Cauda about same length as half of cornicle 43
38. Dorsum without dusky dots at bases of hairs 39
.... Dorsum with dusky dots at bases of hairs 41
39. Reticulated area on cornicle extending about tenth of the length of cornicle (p. 329) .... *timpanogos*
.... Reticulated area on cornicle distinctly exceeding tenth of length of cornicle 40
40. Sensoria on III of aptera 2-3; reticulated area on cornicle .13 long; rostral IV+V .16 long (p. 334) .... *zionensis*
.... Sensoria on III of aptera 19-26; reticulated area on cornicle .22-.30 long; rostral IV+V .19 long (p. 322) .... *rudbeckiae*
41. V shorter than distance across eyes (p. 294) .... *atripes*
.... V longer than distance across eyes; reticulated area on cornicle .25-.30; body light to dark brown (p. 291) .... *ambrosiae*
.... V as above; reticulated area on cornicle .25; body dark wine-red (p. 315) .... *martini*
.... V as above; reticulated area on cornicle not longer than .20; body black to blackish (p. 289) .... *aaroni*
42. Reticulated area on cornicle exceeding fifth of length of cornicle (p. 326) .... *taraxaci*
.... Reticulated area on cornicle not exceeding fifth of length of cornicle; IV distinctly shorter than III; body bluish with reddish tinge. Not on Valeriana (p. 312) .... *kiowanepum*
.... As above but body yellow-brown. On *Valeriana* (p. 329) .... *valerianae*
.... Reticulated area as above; IV not distinctly shorter than III (p. 322) .... *rudbeckiarum*
43. Body red or wine-color; sensoria present on III in aptera 55
.... Body red or orange; sensoria absent on III in aptera (p. 317) .... *nigromaculosum*
.... Body not red or orange; sensoria present on III in aptera 44
44. Hairs on cauda fewer than 7 on each side 45
.... Hairs on cauda at least 7 on each side 47
45. Reticulated area on cornicle .20-.28 long; sensoria on III more than 10 in both alata and aptera; sensoria absent on IV (p. 304) .... *erigeronensis*
.... As above except sensoria present on IV (p. 331) .... *zerogutierreziae*
.... Reticulated area as above; sensoria on III not more than 10 in either alata or aptera, absent on IV (p. 322) .... *rudbeckiarum*
.... Reticulated area on cornicle .10-.18 long 46
.... Reticulated area on cornicle .07-.09 long (p. 329) .... *timpanogos*
46. Cauda with 4-5 pairs of lateral hairs 56
.... Cauda with 2-3 pairs of lateral hairs 58
47. Reticulated area on cornicle .10-.15 long 48
.... Reticulated area on cornicle longer than .20 (p. 310) .... *idahoensis*
48. Sensoria 20 or more on III of aptera; cornicle green with dusky distally (p. 290) .... *albifrons*
.... Sensoria fewer than 20 on III of aptera; cornicle black (p. 334) .... *zionensis*
49. Rostral IV+V shorter than base of VI 50
.... Rostral IV+V longer than base of VI 53
50. Sensoria on III more than 15 in alata, more than 7 in aptera 51
.... Sensoria on III fewer than 15 in alata, fewer than 7 in aptera 52
.... Sensoria on III in alata more than 15, in aptera fewer than 7 (p. 334) .... *zionensis*
51. Reticulated area on cornicle .20 or more long; rostral IV+V .15; body green (p. 327) .... *tenuitarsis*
.... Cornicle as above; rostral IV+V .19; body dark red (p. 322) .... *rudbeckiae*
.... Reticulated area on cornicle shorter than .20 (p. 328) .... *thermopsaphis*
52. Hind tarsal II at least as long as base of VI (p. 310) .... *granarium*
.... Hind tarsal II shorter than base of VI 54
53. Body green or pink; sensoria 15-22 on III in alata (p. 308) .... *gaurae*
.... Body dark brown; sensoria more than 23 on III in alata 59
54. Body pale brownish yellow; cornicle and appendages pale (p. 330) .... *yagasogae*
.... Body shamrock-green; cornicle and appendages black (p. 309) .... *glabrum*

55. Cornicle with reticulated area extending for more than third of length (p. 294)........*atripes*
.... Cornicle with reticulated area extending less than third of length (p. 315)................*martini*
56. Rostral IV+V longer than .14; sensoria 27-32 on III of alata (p. 290)..........*agrimoniellum*
.... Rostral IV+V not longer than .14; sensoria 10-28..........57
57. Antenna beyond base of III heavy and black; sensoria 13-18 on III of alata (p. 320)..........*pseudorosae*
.... Antenna beyond III dusky; sensoria 16-17 on III of alata (p. 289)..........*aetheocornum*
.... Antenna pale; sensoria 18-28 on III of alata (p. 316)..........*mertensiae*
58. Unguis distinctly longer than IV (p. 296)..........*breviscriptum*
.... Unguis coequal with IV (p. 334)..........*zymozionensis*
59. Cornicle not longer than entire length of cauda; rostral IV+V .13; sensoria 24-33 on III of alata (p. 323)..........*sanborni*
.... Cornicle longer than entire length of cauda; rostral IV+V longer than .13; sensoria not fewer than 33 on III of alata..........60
60. Rostral IV+V .15 long; cornicle .45-.60 (p. 298)..........*chrysanthemi*
.... Rostral IV+V .17 long; cornicle .68-.71 (p. 289)..........*aaroni*

Macrosiphum aaroni Knowlton

Macrcsiphum aaroni **Knowlton, 1947d:47.**

Alate Vivipara. **"Black to blackish"; (Cleared and mounted), head and thorax brownish; abdomen colorless with dusky areas at bases of dorsal hairs and with dark lateral areas on all segments except I; antennal I and II dusky, remainder including base of III black; almost entire legs, distal rostrum and entire cornicle black; cauda and anal plate pale. Body length 2.63; across eyes .54; antenna 3.67, III .85-.89, IV .71-.75, V .65-.68, VI .15+.95-"1.01"; sensoria 34-40 on III; cornicle .68-.71, with reticulated area ".16"-.20 long; rostrum slightly surpassing 2d coxa. Cauda slender and tapering, with slight neck, .42 long on median line, .50 on side and bearing 7-8 pairs of lateral hairs and a single dorsal preapical one.**

Collections. On *Chrysothamnus nauseosus* subsp. *nauseosus.* Utah: Honeyville. Alate viviparae Sept. 13; rare.

Chief Distinguishing Characters. Black body with antenna, legs beyond bases of femora and cornicle black or blackish throughout, length of reticulated area on cornicle (not longer than .20), number of sensoria on III of alate vivipara (over 30) and number of hairs on cauda (7-8 pairs of lateral ones).

This species differs from *M. ambrosiae* only in the shorter reticulated area on cornicle (not .25-.30).

Not figured on account of similarity to *M. ambrosiae.*

Macrosiphum aetheocornum Smith and Knowlton

Macrosiphum aetheocornum **Smith and Knowlton, 1939:241; Knowlton, 1940a:197.**

Apterous Summer Vivipara. **"Greenish." (Cleared and mounted), body pale without dark areas at hair bases; tibiae and cornicle pale with dusky tips; tarsi and antenna beyond III blackish; cauda slightly dusky. Body length 3-3.4; across eyes .50-.53; antenna 3.8-3.98; hind tibia 2.2-2.8; rostrum attaining 3d coxa. Cauda tapering, bearing about 4 pairs of lateral hairs and 1-2 preapical ones.**

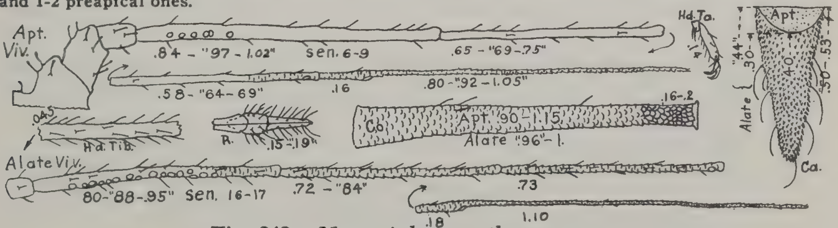

Fig. 343. *Macrosiphum aetheocornum*

Alate Vivipara. **(Mounted), head and thorax brownish; abdomen pale; tarsi, tips of tibiae, rostral IV+V, tip of cornicle and antenna beyond base of III dusky; cauda pale. Body length 2.2-"2.65"; antenna 4.5; hind tibia 2.35; rostrum attaining 3d coxa.**

Collections. On *wild geranium* (*Geranium* sp.). Utah: Logan, Allen and Card Canyons. Apterous viviparae July 18 to Aug. 1, alate viviparae June 16 to July 18; rather rare.

Chief Distinguishing Characters. Presence of reticulation on the cornicle, length of antenna and cornicle, number of sensoria on III of alate vivipara (more than 8) and presence of hairs on the cornicle.

Macrosiphum agrimoniellum (Cockerell)

Nectarophora agrimoniella **Cockerell, 1903a:168.**

Alate Vivipara. **"Light apple-green, without markings"; cornicle beyond base, antenna beyond base of III, rostral IV+V, tarsi and tips of tibiae blackish; cauda and anal plate pale. Body length 2.5-3.2; across eyes .51; antenna 4.5; hind tibia 2.4-2.5; rostrum attaining 2d coxa. Cauda slender, tapering, but with slight neck. Hairs blunt to slightly capitate on vertex and antennal III; blunt to pointed on hind tibia. Cauda with 4-5 pairs of lateral hairs and one preapical one.**

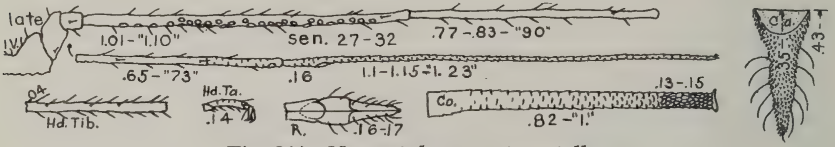

Fig. 344. *Macrosiphum agrimoniellum*

Collections. On *Agrimonia eupatoria* on flower stalks. New Mexico: Beulah. Alate viviparae July 27; very abundant on infested plants.

Type. U.S.N.M.

Chief Distinguishing Characters. Light green body, length of III, and of unguis (at least 1), absence of capitate hairs on tip of cauda, number of sensoria on III in alata (about 30) and extent of reticulated area on cornicle (.13-.15).

Macrosiphum albicornum Knowlton and Allen n. comb.

Mucrotrichaphis albicornus **Knowlton and Allen, 1940:33.**

Alate Vivipara. **"Black; antenna beyond proximal half of III and cornicle dusky." Body length 2; hind tibia 1.15-1.3; tarsal II .14-.15; antenna about 2.3-2.4, III .62-.66, IV .40-.43, V .37-.42, VI .13-.14+.65, sensoria 12-16 on III; cornicle ".45"-.51, with reticulated area .07-.09; cauda .25-.30 on median line, .30-.35 on side; rostral IV+V .13-.15, attaining 2d coxa. Frontal tubercles shallow. Hairs pointed to blunt; .03-.04 long on hind tibia. Cauda spatulate, bearing about 4 pairs of lateral hairs and one preapical one.**

Collections. On *Artemisia tridentata.* Utah: Cache National Forest, Cedar Valley, Logan Canyon, and Smithfield. Alate viviparae May 10 to Aug. 23; not common.

Type and Paratypes. Knowlton Collection.

This form known only from the alate vivipara agrees so closely in color and measurements as well as in hairs with the aptera of *M. zerothermum* that it seems impossible to draw a line of distinction. They, indeed, do differ from the few alatae in longer antenna and cornicle; so they are here retained as distinct awaiting further information as to the range of variation in alatae in the latter species.

Not figured on account of similarity to *M. zerothermum.*

Macrosiphum albifrons Essig

Essig's Lupine Aphid

Macrosiphum albifrons **Essig, 1911c:543; Soliman, 1927:108; Gillette and Palmer, 1934:171; Knowlton, 1935a:114.**

Apterous Summer Vivipara. **Bluish green, pulverulent; cauda pale; cornicle pale except tip; appendages pale to slightly dusky with tips blackish; tarsi black. Body length 3.20-4.20; hind tibia 2.50-3; hind tarsal II .18-.20; antenna 4; rostrum surpassing 2d coxa. Hair slightly capitate; .05 on side of abdomen. Cornicle cylindrical, reticulated at tip. Cauda ensiform, bearing 7-8 pairs of lateral hairs and 2 dorsal preapical ones.**

Alate Vivipara. Head dusky or brownish; thoracic lobes brown; prothorax and abdomen bluish green; pulverulent; antenna dusky beyond base of III; cornicle, cauda and tibia yellowish to dusky, with tarsi and tips of tibiae blackish. Measurements as in apterous vivipara except as follows: Hind tarsal II .16-.18; rostrum attaining 2d coxa.

Ovipara. Apterous. (Mounted in balsam), body without dusky markings; appendages as is apterous vivipara. Body length 3; antenna about 4; cauda .35 on median line, .41 on side; hind tibia hardly swollen but thickly covered with small sensoria on half to two-thirds of length.

Male. Alate. Head and prothorax yellowish brown, meso- and meta-thorax dark brown; abdomen yellow to olive-brown; antenna dusky; cornicle, tibiae and cauda sordid yellow. Body length 3; hind tibia 2.5; antenna 5.

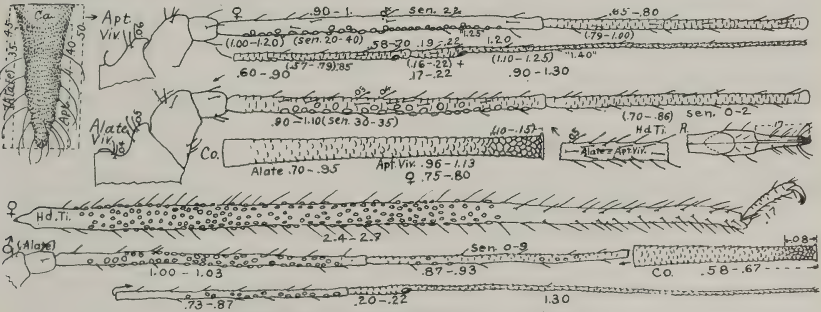

Fig. 345. *Macrosiphum albifrons*

Collections. On leaves of *Lupinus* sp. Colorado: Cherokee Park, Estes Park, Mesa Lakes (on Grand Mesa) and foothills near Fort Collins. Utah: Panguitch. Apterous summer viviparae July 1 to Sept. 17, alate viviparae July 19 to Aug. 15, sexuales Sept. 6 to 21; not common.

Type. U.S.N.M. Paratypes, Essig and Colo. Agr. Exp. Sta. Collections.

Chief Distinguishing Characters. Rather numerous sensoria (19-40) on III of apterous vivipara and (30 or more) in alate vivipara, moderate amount (.10-.15) of apical reticulation on cornicle, rather long rostral IV+V (.17), rather numerous (7-8) pairs of lateral hairs on cauda and length of IV (distinctly shorter than III).

Macrosiphum ambrosiae (Thomas)

The Brown Ambrosia Aphid

Siphonophora ambrosiae Thomas, 1877 (1878):4.
Tritogenaphis kosacaudis Knowlton, 1928d:79; Smith and Knowlton, 1937:271 (synonymy declared).
Macrosiphum ambrosiae, Hottes and Frison, 1931a:298; Gillette and Palmer, 1934:172.
Red Color Variety: *Nectarophora solidaginis* (Fabricius) (misidentification), Cockerell, 1903b:167.
Macrosiphum solidaginis (Fabricius) (misidentification), Gillette, 1911c:383; Davis, 1911a:34.
Siphonophora solidaginis, Williams, 1910:86.
Macrosiphum ambrosiae, Color Variety, Gillette and Palmer, 1934:172.

Apterous Summer Vivipara. Light to dark brown or sepia, with dusky areas about hair bases (most distinct in cleared specimens); cauda and anal plate pale; legs more or less dusky; cornicle and rostral III, IV and V entirely black; antenna dusky to black but paler on I, II and base of III. Body length 2.50-3.50; hind tibia 2.15-2.9; antenna 3.30-4.20; rostrum fully attaining 3d coxa. Hairs blunt to slightly capitate; on side of abdomen .04-.06. Cauda tapering to rather acute point and without definite constriction and bearing 7-8 pairs of lateral and dorsolateral hairs and several dorsal hairs.

Alate Vivipara. Color and measurements same as in apterous vivipara except as follows: Thoracic lobes dark brown; dark blotch on abdominal VI posterior to base of each cornicle; dusky spots at bases of hairs often reduced or lacking; antenna entirely black; rostrum hardly attaining 3d coxa. Hairs on side of abdomen .03.

Ovipara. Apterous. Same as apterous vivipara except hind tibia which is slightly swollen on slightly more than proximal half and bearing numerous small sensoria.

Male. Alate. Head and thorax dark greenish brown; abdomen olive-green; cornicle and appendages except base of antennal III, blackish; cauda pale. Body length 2.15; hind tibia 2; antenna 3.25; cornicle .35-.40, reticulated area .10 long.

Egg. Newly laid, amber-yellow, tinged with greenish; later, black. Size .80 by .40.

Collections. On leaves and tender stems of *Ambrosia trifida, Chrysothamnus nauseosus* subsp. *nauseosus, Iva xanthifolia, Rudbeckia* sp. and occasionally *Helianthus* sp. Throughout region. Apterous summer viviparae May 22 to Oct. 23, alate viviparae May 30 to Oct. 23, sexuales Sept. 15 to Nov. 9; very common and abundant.

Red Color Variety:

This aphid differing only in the brick to blood-red body, seems structurally indistinguishable from *M. ambrosiae.* It differs slightly from *M. solidaginis* (Fabricius) according to van der Goot (1915:90) as follows: Legs not yellow, cauda not black, sensoria more numerous and not distributed along entire III in aptera, cornicle stouter and reticulated on distal third instead of one-sixth (as in figure by Theobald, 1926:98) and possible differences in ratios in antennal segments. Theobald (1926:100) states that the American form, according to Williams (op. cit.) seems not to be the European species. However, he does not state the differences and describes the sensoria in aptera as similar to our form.

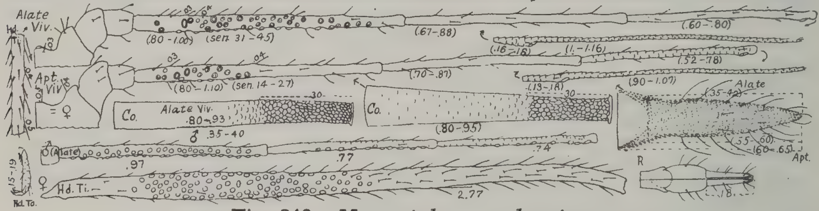

Fig. 346. *Macrosiphum ambrosiae*

From *M. rudbeckiae* this form differs as follows: Darker blood-red color of body, presence of dusky hair bases on dorsum of abdomen, especially in aptera and lack of pale base on cornicle. It appears to be near *M. lanceolatum* Patch, but type specimens of the latter are not available at this time for comparison. Until biological transfer tests determine the relation between these forms it seems best to leave the form on *Solidago* here rather than erect a new species on such slight and possibly unstable differences.

Collections. On leaves and stems of *Solidago* sp., *Lactuca* sp. and *Aster* sp. Colorado: Fort Collins, Loveland, Willow Creek (Custer Co.), Hotchkiss and Rocky Mountain National Park. New Mexico: Pecos. Idaho: Twin Falls. Apterous viviparae May 30 to Oct. 27, Nov. 4, alate viviparae May 30 to Oct. 8; rather common.

Lectotype. Ill. Nat. Hist. Surv. Collection, No. 8179 also paratypes, Nos. 8180 and 8181.

Chief Distinguishing Characters. Dark areas at dorsal hair bases, especially prominent in aptera, pale cauda, entirely black cornicle, typically sepia-brown body, long reticulated portion (about .30) on long cornicle (.80-.95), numerous tuberculate sensoria on III (31-45 in alate and 14-27 in apterous vivipara) and long cauda (about .60), bearing about 7 hairs on each side.

Macrosiphum anomellum Knowlton and Allen n. comb.

Macrosiphum anomellus **(sic.) Knowlton and Allen, 1938c:75.**
Mucrotrichaphis anomellus **Knowlton and Allen, 1940:34.**

Apterous Summer Vivipara. (Cleared and mounted), head dark; abdomen colorless with faint dark areas at the bases of the numerous pointed hairs on dorsum; antenna except proximal portion of III, cornicle, cauda, anal plate, rostrum and legs, especially knees and distal ends of segments, dusky to blackish. Body length 1.5-2; across eyes .49; antenna about 2, III .50-.58-".67," IV .30-.36, V .26-.35, VI .13+".37-.45," sensoria 2-6 on III; cornicle .43-.50, reticulation extending .06-.08 from tip; hind tibia 1.02-1.10-"1.14"; hind tarsal II ".12"-.14-.15; cauda on median line .25-.32, bearing 5 pairs of hairs; rostrum with needlelike tip, IV+V .13-.16 long, attaining 3d coxa. Hairs pointed; on vertex .05; on antennal III .04, equalling diameter of III; on hind tibia .05, slightly longer than diameter of tibia; on abdomen .05 and quite numerous; 3-7 on cornicle. Cauda slender-spatulate.

Collections. On *Artemisia tridentata.* Utah: Little and Big Cottonwood Canyons. Apterous viviparae April 24 and July 10; rare.

Type. U.S.N.M. or Knowlton Collection.

Chief Distinguishing Characters. Numerous fine, spinelike hairs on the body, dark areas at bases of hairs, length of reticulated area (.06-.08) on cornicle.

Not figured on account of close resemblance to *M. zerothermum.*

Macrosiphum artemisiphilum Knowlton and Allen

Macrosiphum artemisiphilum **Knowlton and Allen, 1938c:75.**

Apterous Summer Vivipara. **(Cleared and mounted on slide), body without markings; antenna beyond proximal part of III, cornicle and tibiae black; cauda and tip of rostrum dusky. Body length 1.75-2-"2.8"; across eyes .45; antenna about 3; hind tibia 1.30-1.50; rostrum attaining 3d coxa. Hairs blunt to slightly capitate; on side of abdomen .04 long. Cornicle reticulated at tip and bearing 1-3 hairs.**

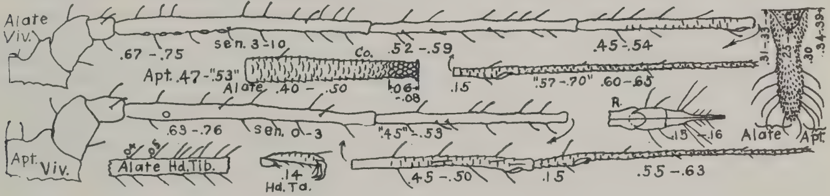

Fig. 347. *Macrosiphum artemisiphilum*

Alate Vivipara. **"Green to blackish green." (Mounted on slide), body without markings; antenna beyond base of III, cornicle and tip of rostrum and legs black; cauda dusky. Body 1.65-2; across eyes .43-.45; antenna 1.55-1.80; hind tibia 1.30-1.50; cornicle bearing 1-3 hairs. Cauda slender-spatulate bearing 5-6 hairs on each side.**

Collections. On *Artemisia tridentata.* Utah: Blue Creek, Cedar Spring and Blue Spring Mountains and Stansbury Island. Alate and apterous viviparae May 3 to June 8; rare.

Type. U.S.N.M. or Knowlton Collection.

Chief Distinguishing Characters. Rather shallow frontal tubercles in apterous vivipara, number of sensoria on III (fewer than 10 in alate and not more than 3 in apterous vivipara), short cornicle (not longer than antennal III), short extent of reticulation on cornicle (.06-.08), presence of hairs on cornicle and length of unguis (shorter than twice the length of cornicle). From *M. essigi* it differs only in the fewer sensoria.

Macrosiphum artemisivulgaris Knowlton and Allen

Macrosiphum artemisivulgaris **Knowlton and Allen, 1938c:76.**

Apterous Summer Vivipara. **"Whitish green." (Mounted on slide), pale; cornicle, tarsi, tips of tibiae and antenna beyond base of III black; cauda and tibiae dusky to blackish. Body length about 2-"2.35"; across eyes .47; antenna about 3; hind tibia 1.70-"1.92"; rostrum attaining about to 3d coxa or "to abdomen." Hairs on body sparse, without dusky areas at bases, slightly capitate and .045 long; on hind tibia heavy spinelike, .03-.05 long, about equal to diameter of tibia. Cauda slender, slightly spatulate, bearing about 7 hairs on each side.**

Collections. On *Artemisia aromatica* and *A. vulgaris.* Utah: Smithfield Canyon. Apterous viviparae Aug. 21 and 24.

Type. U.S.N.M. or Knowlton Collection.

Chief Distinguishing Characters. Glaucous green body with cauda not distinctly black, relatively short cornicle (ranging shorter than antennal V, though limits overlap, but longer than cauda) and only slightly broader at base, number of sensoria on III of apterous vivipara (not more than 10), moderately long acute rostral IV+V (.15-.17 and reaching abdomen), long reticulated area of cornicle (.25 or about two-fifths of length of cornicle), length of many-haired cauda (not shorter than cornicle) and length of antennal segments.

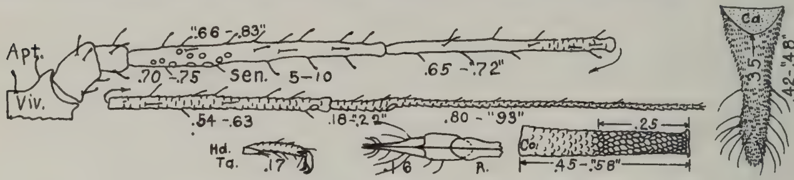

Fig. 348. *Macrosiphum artemisivulgaris*

Macrosiphum atripes Gillette and Palmer

The Dark Red Aster and Goldenrod Aphid

Macrosiphum atripes **Gillette and Palmer, 1933:359 and 1934:173.**

Apterous Summer Vivipara. Dark reddish brown to blackish red with dusky hair bases; cauda pale; cornicle and antenna black throughout; legs black except bases of femora; rostrum black distally; wings hyaline, veins slender. Body length 1.85-3; across eyes .56; hind tibia 1.60-1.80; hind tarsal II .13-.14; antenna 2.54-3. Cauda slender and tapering, with slight neck and acute tip, bearing 6-8 lateral and 3 dorsolateral hairs on each side and a single dorsal preapical one. Rostrum attaining abdominal I or II. Hairs on side of abdomen .03-.04.

Alate Vivipara. Head and thorax black; abdomen dark reddish brown to blackish red; cauda pale; cornicle, appendages and rostrum, especially III and IV+V, black. Measurements same as in apterous vivipara except rostrum attaining to 3d coxa or abdominal I and hairs .03 on body.

Ovipara. Apterous. Color same as in apterous summer vivipara. Body length 2.20-3; across eyes .44-.49; antenna 2.8-3.5, III .68-.90, IV .45-.60, V .40-.50, VI .12-.15+.65-.82, sensoria 17-22 on III; hind tibia 1.5-1.8, very slightly swollen for half of its length and bearing scattered sensoria on three-fourths of length; cornicle and cauda same as in apterous vivipara.

Male. Alate. Same as alate vivipara except the following: Cornicle .45, reticulated area .11; cauda .15 on median line, .20 on side and sensoria on antenna present and numerous on III, IV and V.

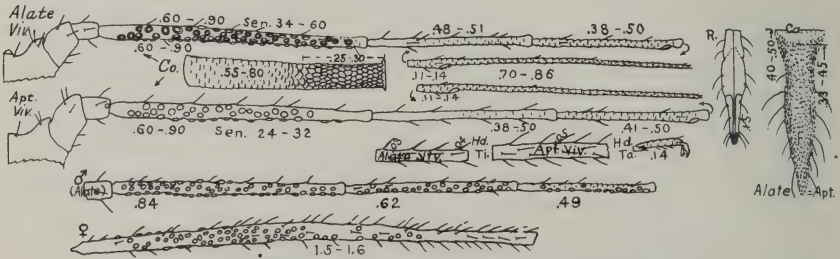

Fig. 349. *Macrosiphum atripes*

Collections. On leaves and stems of *Aster* sp., *Kuhnia eupatoroides* and *Solidago missouriensis.* Colorado: Masonville and Stove Prairie Hill (west of Bellvue). Alate and apterous viviparae June 16 to Sept. 13, sexuales Oct. 12 to 25; rarely collected but very abundant at times on *Aster,* deforming stems.

Type. U.S.N.M., No. 49291. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Rather long reticulated area on cornicle (longer than third of cornicle), color of cornicle, rostrum and tibiae in aptera (black), numerous sensoria on III (on aptera more than 20, on alate vivipara more than 30), length of III (shorter than IV+V), color of cauda (pale) and length of IV (averaging about the same as distance across eyes), length of cauda (distinctly shorter than IV), length of rostral IV+V (not longer than .16) and color of body (dark red to blackish and with dark areas at hair bases).

Macrosiphum barri Essig

Macrosiphum barri **Essig, 1949:151.**

Alate Vivipara. Head and mesothorax pale brownish green; prothorax and abdomen lettuce-green; antenna beyond base of III, tarsi and tips of tibiae blackish; cauda and cornicle pale green. Body length 1.5-1.8; across eyes .39-.41; hind tibia 1.25-1.8; antenna 1.85-1.95; rostral IV+V bearing about 5 pairs of hairs and attaining between 2d and 3d coxae. Cornicle faintly imbricated and without reticulation. Cauda tapering with only slight constriction near base and bearing 3-4 pairs of lateral hairs and a single dorsal preapical one.

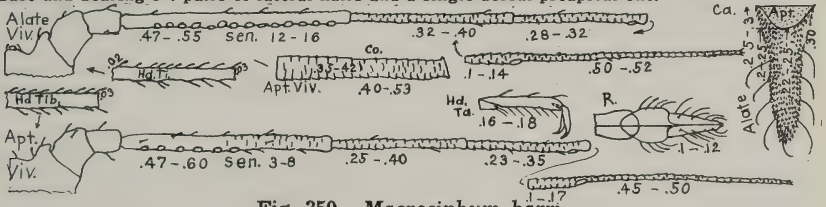

Fig. 350. *Macrosiphum barri*

Apterous Summer Vivipara. General color lettuce-green, shading to yellowish on head; appendages pale green with tarsi, tips of tibiae and of antennal III, IV and V and entire VI blackish. Body length 1.6-2.2; across eyes .42; hind tibia 1.05-1.85; antenna 1.65-2.20; otherwise as in alate vivipara.

Collections. On garden lettuce *(Lactuca sativa),* on seed stems. Colorado: Fort Collins and Palisade. Utah: Murray and American Fork. Alate and apterous viviparae early Aug. to Oct. 23; numerous and injurious but rarely occurring.

Type. Essig Collection. Paratypes, Essig, W. F. Barr, Univ. of Idaho, U.S.N.M. and Calif. Acad. Sci. Collections.

Chief Distinguishing Characters. Absence of reticulation on cornicle, comparatively small number of sensoria on III (12-16 in alate and 3-7 in apterous vivipara), shortness of cornicle (hardly exceeding .40 in alate or .50 in apterous vivipara), shortness of unguis and III (hardly exceeding .50) and short, hairy rostral IV+V (.10-.12).

From *M. scariolae* Nevsky this form is perhaps doubtfully distinct, differing only in shorter antennal III (shorter than .65-.74) and shorter cornicle (shorter than .56) also possibly different shape of cornicle.

Macrosiphum bonitum Hottes

Macrosiphum bonitum **Hottes, 1950a:15.**

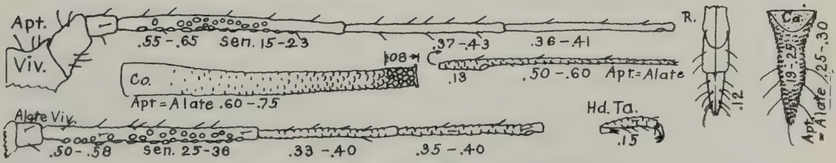

Fig. 351. *Macrosiphum bonitum*

Apterous Summer Vivipara. "Brown to red"; cornicle and appendages black; cauda, anal plate and rostrum blackish. Body length about 2; across eyes .40; antenna about 2-2.4; hind tibia 1.25-1.35; rostrum attaining abdomen. Cauda tapering, with 3-4 pairs of lateral hairs.

Alate Vivipara. Head and thorax black; abdomen "brown or red"; cornicle and appendages black; cauda and anal plate blackish. Body length 2; hind tibia 1.15-1.40; antenna about 2; rostrum attaining 3d coxa or abdomen.

Collections. On *Stephonomeria pauciflora.* Colorado: Gateway. Apterous and alate viviparae Sept. 14; rare.

Type. U.S.N.M.

Chief Distinguishing Characters. Brown to red body with black appendages, numerous sensoria on III (25-30 in alate and 15-23 in apterous vivipara), short extent of reticulation on cornicle (less than .1), few hairs on the cauda (3-4 pairs) and length of rostral IV+V (.12).

Macrosiphum breviscriptum Palmer

Macrosiphum breviscriptum **Palmer, 1936a:277 and 744.**

Apterous Summer Vivipara. Medium green; antenna beyond base of III, cornicle except base, rostral IV+V, distal third of femora and tibiae except area just beyond knee, black; cauda, anal and genital plates pale greenish. Body length 2.5; across eyes .48-.50; hind tibia 1.9-1.95; antenna 3.60; cornicle .80-.92; rostrum attaining nearly to 3d coxa. Hairs slightly capitate. Cauda tapering to slender point, bearing 2-3 pairs of lateral hairs and 2-3 dorsal ones.

Alate Vivipara. Head and prothorax medium yellowish green; meso- and metathorax pale yellowish brown; antenna black beyond base of III; cornicle black except base; tibiae black except pale area just beyond knees; cauda and anal and genital plates pale greenish. Body length 1.9; across eyes .45; antenna 3.6; hind tibia 2-2.20; rostrum attaining 2d coxa. Cauda slender, tapering, with slight tendency to constriction near base and bearing 2-3 pairs of long lateral hairs and 4-6 dorsal ones, mostly on distal third, some of hairs blunt to nearly capitate.

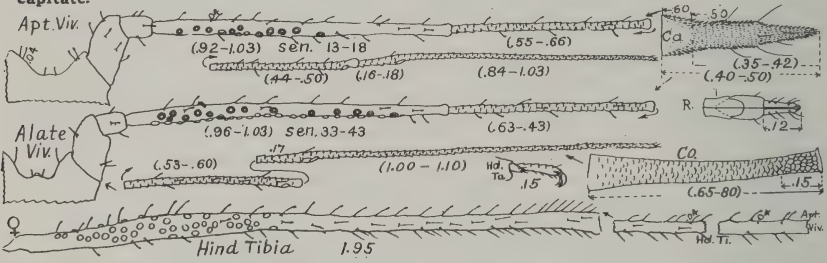

Fig. 352. *Macrosiphum breviscriptum*

Ovipara. Apterous. Color and measurements same as in apterous vivipara except as follows: Body slightly shorter, cauda bearing 10-12 dorsal hairs besides the 2-3 pairs of lateral ones and hind tibia proximal third of which is slightly swollen and rather sparsely covered with sensoria.

Collections. On leaves and stems of *Aster laevis* var. *geyeri, A. laevis, A. novi-belgi* and *A.* sp. but not deforming or curling leaves. Colorado: Fort Collins and Cameron Pass. Alate and apterous viviparae June 22 to Oct. 1, oviparae Oct. 1; not common.

Type. U.S.N.M., No. 51419. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Comparatively short reticulated area (.15) on cornicle, length of cauda (not shorter than .40 for entire length), long antenna (3.6) and number of sensoria on III (13-18 in aptera, 33-43 in alata).

Macrosiphum californicum (Clarke)

The California Willow Aphid

Nectarophora californica **Clarke, 1903:254.**
Macrosiphum laevigatae **Essig, 1911c:548; Gillette and Palmer, 1934:185.**
Macrosiphum californicum, **Essig, 1917:328 (synonymy).**

Apterous Summer Vivipara. Yellowish green, with darker green on median line and on lateral portions; antenna, beyond base of III, pale brown; legs, cornicle and rostrum pale with dusky tips; cauda and anal plate pale. Body length 2.2-2.6, slender; hind tibia 1.80-2.55;

antenna 3.6-4.6; rostrum surpassing 2d coxa. Hairs slightly capitate; on side of abdomen .03-.05. Cornicle with reticulated area .10 long. Cauda tapering, rather broad, bearing 3-5 pairs of lateral hairs and 1-2 single dorsal preapical ones.

Alate Vivipara. Head and prothorax pale green; thoracic lobes yellow-brown; cornicle dusky, occasionally lighter at base; appendages brownish, darker at tips of segments and entire antennal VI; cauda and anal plate pale. Otherwise as in apterous vivipara except rostrum merely attaining 2d coxa and hairs slightly shorter.

Ovipara. Apterous. Head pale brownish yellow; body pale green mottled with light coral-red; appendages brownish. Proximal third of hind tibia swollen to twice diameter of narrowest portion and thickly covered with sensoria. Otherwise as in apterous vivipara.

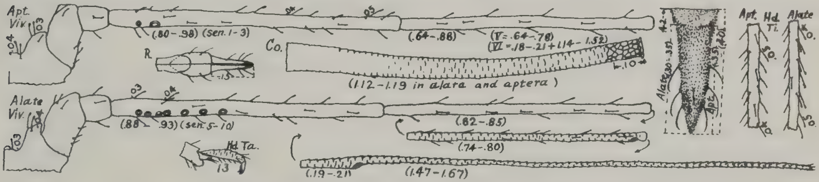

Fig. 353. *Macrosiphum californicum*

Male. Alate. Head and thorax blackish brown; abdomen pale green with black cross-bands and lateral areas; antenna dusky proximally, beyond base of III blackish; legs and cornicle brownish with blackish tips; cauda dusky. Body length 2; cornicle .80; antenna with about 30 sensoria on III, 0 on IV, 20 on V. Otherwise as in alate vivipara.

Collections. On *Salix lutea*, *S. amygdaloides* and *S*. sp. Throughout Colorado and Utah. Apterous summer viviparae June 15 to July 31 and Aug. 14 to Oct. 23, alate viviparae July 2 and Aug. 20 (rarely found), sexuales Oct. 15 to 24; not common.

Cotypes. Essig and Colo. Agr. Exp. Sta. Collections.

Essig (1917:328) considers this species as Clarke's *M. californicum* though Clarke's description in measurements of the antenna differs radically from this form and his types do not exist to correct the concept of the species in case of error in description.

Chief Distinguishing Characters. Pale yellowish body with median and lateral lines of green, small number of sensoria on III of the alate vivipara (5-10), long cornicle (more than 1 long, about 1.3 times the length of antennal III), short extent of reticulation on the cornicle (.10), few hairs on cauda and rather short cauda (about .30-.35 on median line, only about half of the length of antennal V).

Macrosiphum cefsmithi Knowlton and Allen

Macrosiphum cefsmithi **Knowlton and Allen, 1938c:76.**

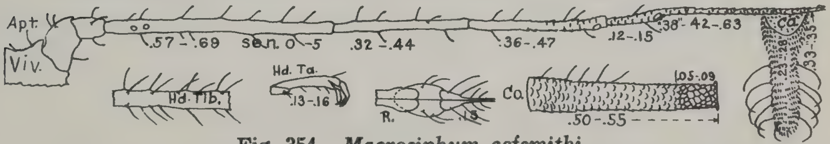

Fig. 354. *Macrosiphum cefsmithi*

Apterous Summer Vivipara. "Shiny apple-green to darker green and bluish green"; antenna, except base of III, cornicle, cauda, anal plate, rostrum, tarsi and tips of tibiae black; tibiae, except tips, dusky. Body length "1.6"-1.8; across eyes .46-.48; antenna 2.20-2.40, III .60-.67, IV .33-.43, V .36-.45, VI .13-.15+".48"-.63, sensoria 0-4-"5" on III; cornicle ".47-.59," bearing 2-4 hairs, reticulated area ".03"-.05-.09 long; cauda .23 on median line, ".28-.35" long on side; rostral IV+V .14-.16. Cauda spatulate, bearing 4-5 pairs of lateral hairs.

Collections. On *Artemisia tridentata*. Utah: Curlew Valley, Cedar Spring, Showell and Rattlesnake Pass. Apterous viviparae April 30 to May 13; apparently rare.

Type. Knowlton Collection or U.S.N.M.

This species is very close to *M. essigi* and *M. filifoliae;* indeed it is rather a connecting link between these two species, especially in respect to length of unguis and cornicle (the former varying from longer than to shorter than the latter). The only difference appears to be in relative length of antennal III which is greater than length of either unguis or the cornicle and in body color which is apple-green to bluish-green. This species appears structurally identical with *M. zerothermum* (Knowlton and Allen) except in the capitate instead of pointed hairs.

Macrosiphum chrysanthemi (Oestlund)

Nectarophora chrysanthemi Oestlund, 1887:84.
Macrosiphum chrysanthemi, Hottes and Frison, 1931a:302; Gillette and Palmer, 1934: 174.

Apterous Summer Vivipara. Dark brown; cornicle black throughout; cauda yellow to slightly dusky; antenna dusky, paler on II and base of III; tibiae pale to brownish. Body length 2.25-3; hind tibia 2-1.85; antenna 2.8-2.95; rostrum surpassing 2d coxa. Hairs blunt to slightly capitate; on side of abdomen .04. Cauda slender, spatulate with rather acute tip, bearing 4-6 pairs of lateral hairs and 1-2 dorsal preapical ones.

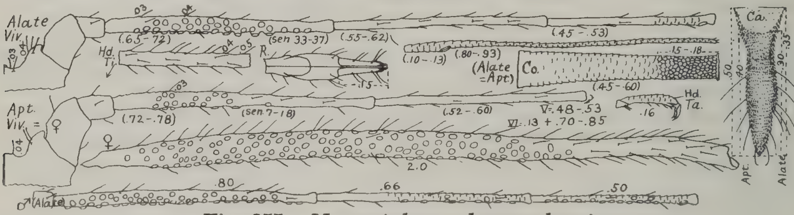

Fig. 355. *Macrosiphum chrysanthemi*

Alate Vivipara. Same as apterous vivipara except as follows: Rostrum merely attaining 2d coxa; hairs on hind tibia .03-.04 and on side of abdomen .03.

Ovipara. Apterous. About the same as apterous vivipara except hind tibia the proximal two-thirds of which is distinctly swollen to nearly twice the diameter of narrowest portion and bearing numerous sensoria which extend for three-quarters of length of tibia.

Male. Alate. Body length 1.80-2; hind tibia 1.40; antenna 2.83, sensoria about 40 irregularly arranged on III, about 8 in single row on IV and V each; cornicle .30, apical reticulated area .10; cauda .13 on median line.

Collections. On *Bidens* sp. Colorado: Fort Collins. Utah: Blacksmith Fork Canyon and Honeyville. Apterous viviparae June 30 and Aug. 5 to Sept. 19, alate viviparae June 30 and Aug. 5 to Sept. 2, sexuales Sept. 19; not common.

Type. Univ. of Minn. Collection.

Chief Distinguishing Characters. Dark brown body, length of the reticulated area on cornicle (.15-.18), numerous sensoria on III (33-37) in alate vivipara and 4 pairs of lateral hairs on cauda.

Macrosiphum cockerelli Hottes

Hottes' Green Goldenglow Aphid

Macrosiphum rudbeckiarum (Cockerell), (misidentification), Hottes, 1949a:47.
Macrosiphum cockerelli Hottes, 1950c:100.

Apterous Summer Vivipara. "Pale green" with all appendages pale except antenna beyond III, tarsi, tips of tibiae and of cornicle and rostral III and IV+V dusky. Body length 3.10-4.50; across eyes .60-.63; across head anterior to eyes .45; hind tibia about 4; antenna about 6; rostrum attaining between 2d and 3d coxae. Cauda cylindrical to tapering, bearing 5-6 hairs on each side and 1-2 dorsal preapical ones.

Alate Vivipara. Same as apterous vivipara except as follows: Body length 3-3.6; across eyes .58; hind tibia 3.2-3.5; rostrum hardly attaining 2d coxa.

Ovipara. Color about same as apterous summer vivipara. Body length 2.6-3; antenna about 4.50, III .95-1.10, IV .80-1.10, V .75-.95, VI .20-.23+1.20-1.40, sensoria 3-7 on III;

hind tibia with proximal seventh slightly swollen and bearing scattered flat, indistinct sensoria; cauda .30-.43 on median line, .35-.48 on side; cornicle 1.05-1.15, reticulated area .15.

Male. Alate. Head and thorax brown; abdomen marked with short dorsal bands on I through VI; cornicle and cauda pale; antenna black except II and base of III which are dusky; rostrum and tibiae dusky especially at tips. Body length 1.50-1.80; antenna about 5; hind tibia 2.65-2.85; cornicle .50-.65, reticulated area .10-.15; cauda .20 on median line, .25 on side.

Collections. On *Rudbeckia montana,* on leaves and stems. Colorado: Skyway. Apterous viviparae June 25 to Sept. 23, alate viviparae July 30, oviparae Sept. 14 to Oct. 3, males Sept. 3; not common.

Type. U.S.N.M. Paratypes, Hottes Collection.

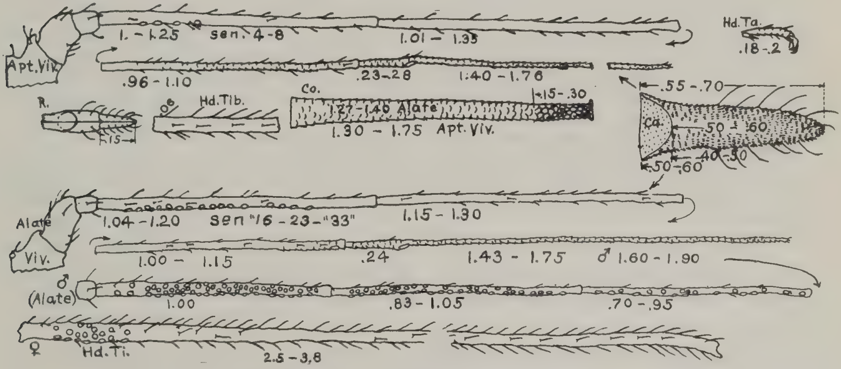

Fig. 356. *Macrosiphum cockerelli*

Chief Distinguishing Characters. Light green body, number of sensoria on III of alate vivipara (16-23), small number of sensoria and their location on proximal seventh of hind tibia of ovipara, length of reticulated area on cornicle (.15-.25), length of rostral IV+V (.15), length of antennal IV (about the same as III) and length of unguis (about the same as cornicle in apterous vivipara, longer in alate vivipara).

Macrosiphum corallorhizae (Cockerell)

Nectarophora corallorhizae Cockerell, 1903a:167.

Apterous Summer Vivipara. "Green without markings"; antennal V and VI and tips of III and IV, rostral IV+V and cornicle beyond base dusky; tarsi and tips of tibiae blackish; cauda and anal plate pale. Body length 2.5-3; across eyes .53; antenna 4-4.5; hind tibia 2.8-3; rostrum attaining 2d coxa. Hairs blunt to slightly capitate; on vertex and antennal III .04-.05 long; on hind tibia pointed, .04-.05, about same length as diameter of tibia. Cauda slender and tapering to blunt tip, bearing 4-5 hairs on each side. Cornicle somewhat curved outward at tip and slightly constricted on reticulated area.

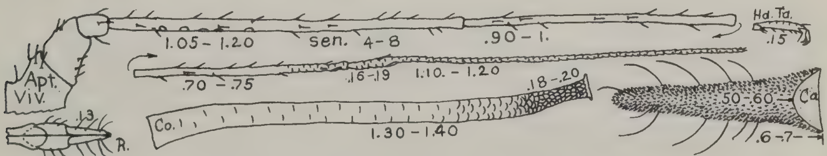

Fig. 357. *Macrosiphum corallorhizae*

Collections. On *Corallorhiza multiflora.* New Mexico: Beulah. Apterous viviparae in July; numerous.

Type. U.S.N.M.

Chief Distinguishing Characters. Green body, somewhat outward curved and slightly constricted cornicle with reticulated area .18-.20 long, length of antenna (III exceeding 1). This species falls in the *M. solanifolii* and *M. creelii* complex, differing from the former in the longer antenna and cornicle and from the latter, apparently, only in the shorter antennal IV (not longer than .75 instead of .75-.95). Host transfer tests may prove *creelii* a synonym.

Macrosiphum coweni (Hunter)

Nectarophora artemisiae Cowen (in Gillette and Baker), 1895:123 (preoccupied.)
Nectarophora coweni Hunter, 1901:114 (new name for *N. artemisiae* Cowen).
Macrosiphum coweni, Gillette and Palmer, 1934:175.

Apterous Summer Vivipara. Dark brown to blackish green to black; cauda and cornicle dusky throughout; appendages brown to blackish except base of antennal III. Body length 1.5-2; across eyes .47; hind tibia 1.3-1.7; hind tarsal II .15-.17; antenna 2.4-3.2, III .60-.80, IV .40-.60, V .30-.50, VI .15-.19+.65-.90, sensoria 3-8 on III; cornicle .55-.70, reticulated area .05-.10 long; rostrum acute, tip needlelike, IV+V .16, attaining 3d coxa. Cauda elongate-spoon-shaped, pointed, .25-.40 on median line, .40-.50 on side, bearing 4-5 pairs of lateral hairs and 2 pairs of dorsal hairs. Hairs blunt to slightly capitate; on vertex, on antenna and hind tibia .04-.05; on side of body .04-.06; cornicle bearing 3-5 hairs.

Alate Vivipara. Color and measurements as in apterous vivipara except as follows: Sensoria 15-23 on III; cauda .25 on median line, .30 on side; rostrum attaining 2d coxa. Hairs blunt to slightly capitate; on vertex .02-.03; on antenna and hind tibia .04-.05; on side of abdomen .05.

Collections. On leaves and tips of *Artemisia tridentata* and *A. vulgare.* Throughout region. Apterous summer viviparae May 3 to Sept. 30, alate viviparae June 18 to July 18, oviparae Nov. 22; common.

Type. Lost.

Neotype. U.S.N.M. Paraneotypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Number of hairs on cornicle (3-5), length of reticulated area on cornicle (.08), length of unguis (generally longer, never shorter than cornicle), dark brown to blackish green or black body, rather small number of sensoria on III (3-11 in apterous and 15-23 in alate vivipara) and needlelike tip of rostrum.

This species is separated from *M. artemisiae* (Boyer de Fonscolombe) (judging from specimens determined by Hille Ris Lambers and from description by Theobald, 1926:161) as follows: Needlelike tip of the rostrum (lacking in *artemisiae* which has tip acute but not needlelike), length of cornicle (exceeding length of cauda instead of shorter than cauda as in *artemisiae)* and extent of reticulation on cornicle (much less than half of cornicle instead of about half).

Not figured on account of similarity to *M. filifoliae.*

Macrosiphum creelii Davis

The Alfalfa Aphid

Macrosiphum creelii Davis, 1914a:41; Gillette and Palmer, 1934:176.

Apterous Summer Vivipara. Pale green, darker on median line; cauda and tibiae pale to slightly dusky; cornicle dusky on distal half; antenna dusky on I, II and base of III, remainder blackish throughout; cauda pale to slightly dusky. Body length 2.3-4; hind tibia 2-3; hind tarsal II .16-.19; antenna 4.3-5, III 1.0-1.23, IV .90-1.2, V .80-1, VI .24-.28+1.16-1.5, sensoria 5-8 on III; cornicle 1.1-1.3, reticulated area .18 long; cauda .46 on median line, .50 on side; rostral IV+V .13, attaining 2d coxa. Hairs slightly capitate; on vertex .03; on antennal III .04-.05; on hind tibia .06; on side of body .04-.05. Cauda tapering, without noticeable neck, 4-5 hairs on each side and a single dorsal preapical one.

Alate Vivipara. Same as apterous vivipara except as follows: Head and thorax pale brownish; cornicle .93-1.20; sensoria 15-21 on III.

Collections. On leaves of alfalfa *(Medicago sativa).* Colorado: Fort Collins, Florissant and Masonville. Utah: Tooele. Apterous summer viviparae June 1 to Aug. 13, alate viviparae June 14 to July 8 and Oct. 1; rather rare.

Type. Davis Collection.

This species is very close to *M. solanifolii* (Ashmead); differing only as follows: Longer antennal III, IV and V, III about 1 or longer instead of .70-.90, base of VI about twice as long as rostral IV+V, instead of 1-1.3 times and cornicle usually longer (1.1-1.3).

This species seems to differ from *M. corallorhizae* only in the longer antennal IV (not shorter than .74 instead of .70-.75). It appears doubtful that these species are distinct but without biological evidence of host plant transfers it seems best to leave them separate.

Not figured on account of structural similarity to *M. solanifolii.*

Macrosiphum crenicornum Smith and Knowlton

Macrosiphum crenicornum **Smith and Knowlton, 1939:243.**

Apterous Summer Vivipara. "Light green with dark, faint longitudinal stripe on the dorsum." (Mounted on slide), abdomen without dark areas at bases of hairs; head somewhat dusky; antenna, rostral IV+V, tarsi and tips of tibiae more or less dusky; cauda, cornicle and tibiae pale to slightly dusky. Body length 3-4 ("3.45-5.07"); across eyes .58-.62; antenna 3-3.25 ("3.4-3.8"); hind tibia 2-2.4, ("2.33-2.77"); rostrum attaining 3d coxa. Cornicle imbricated, without reticulation, bearing about 11 hairs. Cauda slightly tapering, blunt, bearing about 8-10 hairs on each side and about 3 dorsal ones.

Alate Vivipara. Color same as apterous vivipara. Body length 2.25-2.5 ("2.82-2.92"); across eyes .58-.62; antenna 3-3.3 ("3.17-4"); hind tibia 2.1-2.4; rostrum attaining between 2d and 3d coxae. Hind tibia with proximal third occasionally bearing about 6 sensoria, partly clustered and partly scattered.

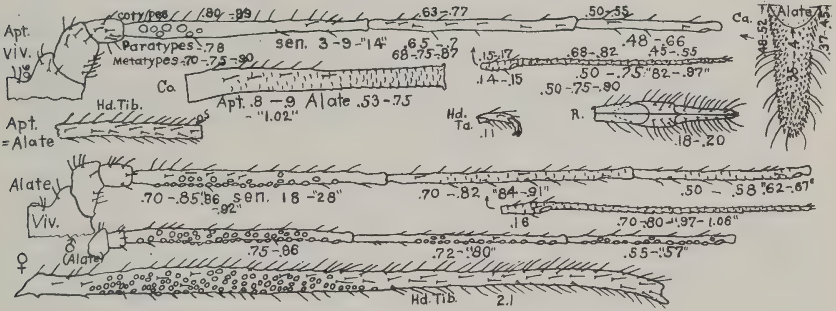

Fig. 358. *Macrosiphum crenicornum*

Ovipara. Apterous. Same as apterous vivipara except proximal half of hind tibia swollen and bearing numerous sensoria.

Male. Alate. Similar to alate vivipara except slightly smaller and antenna bearing numerous sensoria on III, IV and V as shown in figure.

Collections. On *Geranium richardsoni* and *G.* sp. Utah: Aspen Grove, Card and Logan Canyons, Monte Cristo, Mounts Nebo and Timpanogos, Sardine Canyon and along Beaver Creek, along the latter also in Idaho. Apterous viviparae June 16 to Sept. 13, alate viviparae July 18 till in August, sexuales July 18 and in August; not common.

Type. U.S.N.M. Paratypes, C. F. Smith and Knowlton Collections.

Chief Distinguishing Characters. Absence of reticulation on cornicle, length of unguis (.7-1.1 times III, .8-1.14 times IV), immaculate, light green body, length of cauda (.35-.45) and bearing 8-10 pairs of hairs, length of rostrum IV+V (.18-.21, 1.5 times hind tarsus), length of cornicle (.53-.90) and presence of about 11 hairs on cornicle and numerous hairs on cauda and rostral IV+V.

Macrosiphum dirhodum (Walker)

The Rose Grass Aphid

Aphis dirhoda (sic.) Walker, 1849:43.
Macrosiphum dirhodum, Patch, 1914a:268; Theobald, 1926:135; Gillette and Palmer, 1934:176.
Myzus haywardi Knowlton, 1942b:5 n. syn.

Apterous Summer Vivipara. Yellow to pale green, darker on median and lateral lines; cauda pale; cornicle pale with dusky tip; legs pale to dusky; antenna pale. Body length 2.4-2.8; hind tibia 1.2-1.7; hind tarsal II .15-.17; antenna 2-2.6; rostrum attaining 2d coxa. Hairs slightly capitate; on side of body .01 and sparse. Cornicle imbricated, without reticulation. Cauda tapering to rather blunt tip, without distinct neck and bearing 3-4 or, rarely, 5 pairs of lateral and 1-3 single dorsal hairs.

Alate Vivipara. Same as apterous vivipara except as follows: Head and thorax yellow-brown to brown; antenna blackish beyond base of III; rostrum attaining only to 2d coxa.

Ovipara. Apterous. Pale lemon-yellow, often mottled with reddish, paler on head; antenna pale with distal ends of segments and entire VI dusky; cornicle except tip, cauda and tibiae pale; tarsi dusky. Body length 1.80; hind tibia .86; antenna 1.40-1.50. Nearly four-fifths of hind tibia swollen, at widest part to about twice the width of narrowest part, and bearing numerous sensoria.

Male. Alate. Head yellow-brown; thorax dark brown; abdomen buff with dark dorsal bands, dorsolateral intersegmental spots and lateral areas on all segments; antenna and hind tibiae dark brown to blackish, cornicle and cauda slightly dusky. Body length 2; hind tibia 1.50; antenna 2.60.

Egg. Newly laid, pale yellowish; later, black. Size .70 by .30.

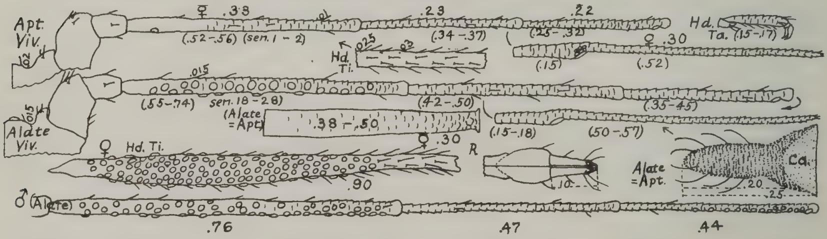

Fig. 359. *Macrosiphum dirhodum*

Collections. As winter host, on leaves and twigs of rose *(Rosa* sp.); as summer hosts, on celery *(Apium graveolens),* oat *(Avena sativa), Bromus tectorum, Elymus* sp., and *Phalaris* sp. Throughout region. Fundatrices April 10 to 23; summer apterous viviparae on winter host Oct. 23 to 29, on summer hosts July 24 to Oct. 2; alate viviparae (fall migrants) on winter host Sept. 20 to Dec. 3; on summer hosts June 24 to Nov. 12; oviparae on winter host Oct. 11 to Nov. 23; males on winter host Oct. 11 to Nov. 23, on summer hosts Oct. 16; common.

Chief Distinguishing Characters. Rostral IV+V broad and short (.10 long, equalling two-thirds length of base of antennal VI or hind tarsal II), cornicle without reticulation, number of sensoria on III of apterous vivipara (1-2), cauda short (.20 on median line) and rather broad without distinct neck, pale yellow to green body with darker green mediodorsal stripe and with blackish tip on cornicle, rather low frontal tubercles and small number of sensoria on III (1-2 in apterous vivipara and 18-28 in alate vivipara).

Theobald (op. cit.) expresses doubt as to the identity of the American and European species but fails to state differences except that Theobald's figure of the cornicle of Patch's species exaggerates the doubtful suggestion of possible reticulation in Patch's figure. Reticulation is absent in the form here treated, as is the case also in the European form, and therefore does not constitute a character for separation.

Macrosiphum eoessigi Knowlton

The Red Hollyhock Aphid

Macrosiphum eoessigi Knowlton, 1947e:137.

Fundatrix. Same as early summer apterous vivipara.

Apterous Summer Vivipara. "Reddish brown to maroon-red, occasionally with slight greenish cast." (Mounted on slide), cornicle and appendages except base of antennal III black; rostrum, cauda, anal plate and genital plate dusky to blackish; dorsal hair bases surrounded by blackish areas "which may coalesce to form a broken band on dorsum of segment preceding cauda; usually with dark lateral areas posterior to cornicle." Body length 2-3.5; across eyes .55; antenna 3.32-"4.19"; hind tibia 1.8-2.35-"2.8"; rostrum attaining 3d coxa. Cauda slender, tapering or with slight neck, bearing 4-8 hairs on each side and one or two dorsal preapical ones.

Alate Vivipara. Head and thorax black; otherwise color same as apterous vivipara. Body length 2-2.8-"3.1"; across eyes .50; antenna 3.5-"4"; hind tibia 2.15-"2.50"; rostrum attaining 3d coxa.

Ovipara. Apterous. Color and measurements same as in apterous vivipara except as follows: Body length 2.3-2.5; antenna about 2.56-3.10; hind tibia 1.6-1.85-"1.91," bearing small scattered sensoria on proximal half which is blackish. Cauda tapering or with slight constriction, bearing 4-7 hairs on each side and one preapical one.

Male. Apterous. Body length "1.67"-2; antenna 2.42-3; hind tibia 1.43-1.77; cornicle ".39"-.53 with reticulated area .06-.08; cauda .19-.25 long.

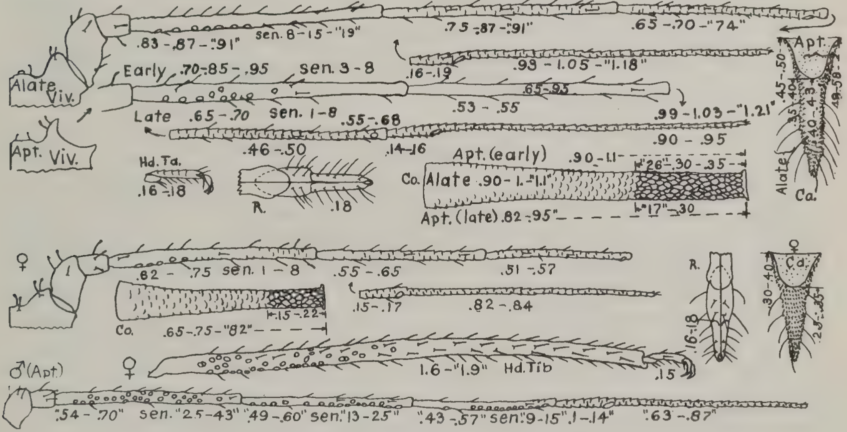

Fig. 360. *Macrosiphum eoessigi*

Collections. On hollyhock *(Althea rosea).* Throughout Utah, Wyoming and Idaho. Fundatrices May 1, summer viviparae May 1 to Oct. 16, alate viviparae May 13 and 25, sexuales Sept. 9 to Oct. 16; very abundant and injurious, at times, especially in spring and fall.

Type. Knowlton Collection. Paratypes, U.S.N.M. and Utah and Colo. Agr. Exp. Sta., Essig, C. F. Smith, and A. N. Tissot Collections.

Chief Distinguishing Characters. Small number of sensoria on III of alate vivipara and on the hind tibia of ovipara, well developed dusky areas about the bases of the dorsal hairs, intensely black appendages and dusky cauda and anal plate, reddish brown body, length of cornicle (not longer than 1.1), length of reticulated area on cornicle (one-fourth of length of cornicle) and length of rostral IV+V (.17-.18).

Macrosiphum erigeronensis (Thomas)

The Canadian Fleabane Aphid

Siphonophora erigeronensis Thomas, 1877:7.
Macrosiphum erigeronensis, Hottes and Frison, 1931a:304; Gillette and Palmer, 1934: 177.

Apterous Summer Vivipara. Pale to median yellowish green; cornicle black only at tip; tibiae pale to dusky; antenna blackish at tips of segments and dusky beyond base of III; cauda pale. Body length 2.5; across eyes .47; hind tibia 1.7; hind tarsal II .14-.15; antenna 2-3; rostrum surpassing 2d coxa. Hairs capitate; on side of abdomen .03-.04. Cauda tapering to rather acute point, without distinct constriction, bearing 3-4 pairs of lateral hairs and two dorsal single ones near tip, with 4-5 hairs near tip capitate, often only straight.

Alate Vivipara. Same as apterous vivipara except as follows: Head and thorax, cornicle, except base, and antenna beyond base of III black; hind tibia 1.35-1.55; rostrum attaining only to 2d coxa. Hairs on side of abdomen .03.

Ovipara. Apterous. Same as apterous vivipara except as follows: Proximal half of hind tibia swollen to twice width of narrowest portion, blackish in color and bearing numerous sensoria. Body length 2.35; antenna 2-2.2; cauda .25 on median line.

Male. Alate. Head and thorax dark brown; abdomen brownish green to yellowish brown with faint dorsal dashes; all appendages dark. Body length 1.50-2; hind tibia 1; antenna 2; cornicle .27-.32; cauda .13-.15 on median line, .18-.20 on side, terminal hair capitate or abruptly curved at end; rostral IV+V .12 long.

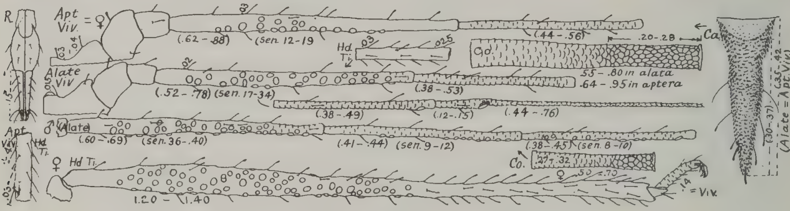

Fig. 361. *Macrosiphum erigeronensis*

Collections. On *Erigeron canadense* and *E. subtrinervis.* Colorado: Boulder, Greeley, Lindland and Fort Collins. Utah: Springdale and Zion Park. New Mexico: Pecos. Fundatrices May 16, apterous summer viviparae June 16 to Nov. 27, alate viviparae June 6 to Nov. 27, sexuales Sept. 28 to Oct. 31; common.

Type. Not recovered. Neotype, Ill. Nat. Hist. Surv. Collection, No. 5157.

Chief Distinguishing Characters. Length of unguis (shorter than III), length of antennal III (same as cornicle), length of reticulated area on cornicle (.20-.24), presence of 1-4 capitate to straight hairs on tip of cauda, pale green body, hind tibia, rostrum and cornicle pale with blackish only distally or at extreme tip and dorsum of body without dark areas at hair bases.

Macrosiphum escalantii Knowlton

Macrosiphum escalantii Knowlton, 1928d:79; Smith and Knowlton, 1937b:269.
Tritogenaphis utahensis Pack and Knowlton, 1929:202.
Tritogenaphis gutierreziae Pack and Knowlton, 1929:203 n. syn.

This species seems inseparable from *M. erigeronensis.* To describe and draw it would be but to repeat the description of that species except that the length of the cornicle is often greater (in alate vivipara .60-1.03, in aptera .70-1.05-"1.2") and with reticulated area .20-.30. This is the form referred to by Gillette and Palmer (1934:178) as differing only in longer cornicle; but study of metatypes and neotypes shows that this character overlaps in range of variation so that no exact line of distinction can be drawn. However, since no biological evidence as to interchange of host plant has been obtained it seems best not to declare the name a synonym.

Collections. On *Aster* sp., *Chrysothamnus nauseosus* subspp. *nauseosus* and *viscidiflorus, Gutierrezia* sp. and *Lactuca* sp. Throughout region. Alate and apterous viviparae July 15 to Nov. 3, sexuales Oct. 25 to Nov. 12; common.

Macrosiphum essigi (Soliman)

Obtusicauda essigi Soliman, 1927:99.
Macrosiphum essigi, Knowlton and Allen, 1938c:78.

Apterous Summer Vivipara. "Dark olive-green with metallic luster" with dark areas at bases of dorsal hairs; antenna, except proximal half of III, entire cornicle, rostrum, cauda, anal and genital plates, and legs except proximal half of tibiae beyond knees, black. Body length 2-2.50; across eyes .42-.48; hind tibia 1-1.20; antenna 2-2.78, III .50-.70, IV .35-.51, V .30-.42, VI .12-.14+.65-78, sensoria 2-6 on III; cornicle .40-..55, reticulated area .08-.09; rostral IV+V .14-.17, needlelike, attaining between 2d and 3d coxae. Hairs slightly capitate; on vertex .05 long; on antennal III .03-.05; on hind tibia .05, slightly longer than diameter of tibia; on body .05 and numerous; 2-4 hairs visible on cornicle. Cauda elongate-spatulate, bearing 4-7 lateral pairs of hairs and one preapical one.

Alate Vivipara. Color and measurements about the same as in apterous vivipara except sensoria 14-16 on III.

Ovipara. Apterous. Same as apterous vivipara except hind tibia which is moderately swollen on proximal third, which portion is thickly covered with sensoria.

Collections. On *Artemisia tridentata,* on tender tips. Colorado: Manitou, Grand Junction, Radium and Home. Utah: Newton, Trenton, Snowville, Blacksmith Fork Canyon and Hansel's Mountains. Wyoming: Casper and Chimney Rock (near Jelm). Apterous viviparae May 1 to September 15, alate viviparae May 1 to Oct. 9, oviparae Oct. 9 to Nov. 22; not rare.

Cotypes. Essig Collection, Box No. 231, Univ. of Calif. and L. B. Soliman Collections.

Chief Distinguishing Characters. Length of the cornicle (.41-.54), length of unguis (.65-.78, longer than cornicle) and dark olive-green to black body.

Not figured on account of the close similarity to *M. coweni* and *M. filifoliae.*

Macrosiphum filifoliae Gillette and Palmer

Macrosiphum filifoliae Gillette and Palmer, 1928:5 and 1934:179; Knowlton and Allen, 1938c:80.

Apterous Summer Vivipara. Cinnamon-brown to amber-brown tinged with yellow-ochre laterally; cornicle, cauda, antenna beyond base of III, and tibiae, except proximal third distal to knees dusky to black. Body length 1.7-2.3; hind tibia 1.1-1.26; hind tarsal II .14; antenna 2.2-2.7; rostrum with needlelike tip, attaining nearly to 3d coxa. Hairs slightly capitate; on side of body .05. Cornicle with reticulated area .07-.08 and with 6-8 hairs. Cauda with neck and tapering, bearing 6-7 pairs of lateral hairs.

Alate Vivipara. Same as apterous vivipara except as follows: Thorax yellow-brown or greenish; rostrum attaining only to 2d coxa.

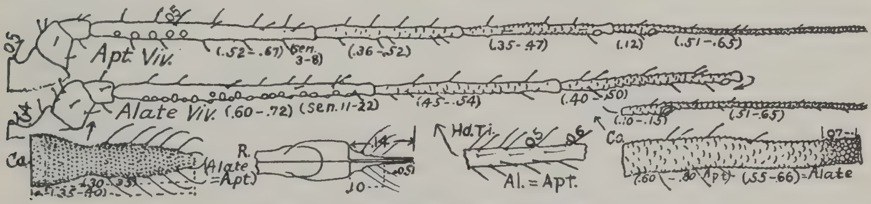

Fig. 362. *Macrosiphum filifoliae*

Collections. On leaves and tips of *Artemisia filifolia* and *A. tridentata.* Colorado: Greeley, Denver, Barnesville and Fort Collins. Utah: Woodruff. Idaho: 20 miles west of Castleford. Apterous and alate summer viviparae June 20 to Sept. 18; apparently rare (host plant very rarely observed).

This species is very close to *M. coweni* but appears to differ as follows: Length of unguis (never exceeding cornicle), hairs on cornicle 6-8 while *coweni* has 3-5 and body brown, not blackish.

Type. U.S.N.M., No. 41974. Paratypes, Colo. Agr. Exp. Sta. Collection.

Macrosiphum flavilum (Knowlton and Allen) n. comb.

Mucrotrichaphis flavila Knowlton and Allen, 1940:35.

Alate Vivipara. "Dark." (Cleared and mounted), head and thorax dark; abdomen with dark areas at bases of hairs, especially dorsolaterally, which tend to coalesce; entire antenna except base of III, legs, cornicle, cauda, anal plate and rostrum dark. Body length 2.1-2.3; across eyes .50; antenna 3.07-3.2; hind tibia 1.50; rostrum attaining 2d coxa. Hairs pointed to blunt. Cornicle bearing 5-8 hairs. Cauda slender, spatulate to parallel-sided, bearing about 5 pairs of lateral and dorsolateral hairs.

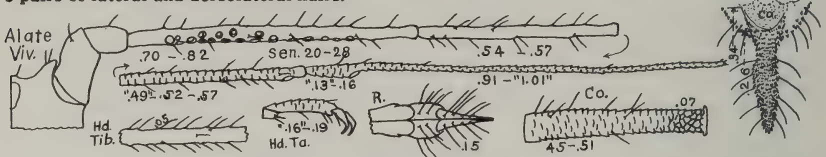

Fig. 363. *Macrosiphum flavilum*

Collections. On *Artemisia* sp. Wyoming: Yellowstone National Park. Idaho: Montpelier. Alate viviparae July 18 and 19; rare.

Type. U.S.N.M. or Knowlton Collection.

Chief Distinguishing Characters. Long antenna, especially unguis (.90-1) and large number of sensoria (20-28) on III of alate vivipara.

Macrosiphum frigidae (Oestlund)

Nectarophora frigidae Oestlund, 1887:83.
Macrosiphum frigidae, Essig, 1911c:546; Gillette and Palmer, 1928:6 and 1934:179; Knowlton and Allen, 1938c:80.

Apterous Summer Vivipara. Dark metallic green, shining; dark specks at dorsal hair bases; cauda dusky; antenna black beyond base of III; tibiae dusky yellow to blackish; cornicle black. (Cleared and mounted), cornicle, cauda, anal plate, entire legs except bases of femora, entire rostrum and antenna except base of III blackish; head and subgenital plate dusky; areas at bases of dorsal hairs usually pale dusky also a lateral row of black spots each adjacent to a spiracle and 2 dorsolateral rows of spots. Body length 2; across eyes .45-.55; hind tibia 1.3-1.5; hind tarsal II .15-.17; antenna 2.3-2.7; rostrum attaining 3d coxa. Hairs slightly capitate; hind tibia .05-.06; on side of abdomen .06. Cauda spatulate, bearing 4 pairs of lateral and 2 single dorsal preapical hairs. Cornicle usually with about 2 hairs; reticulated area .08.

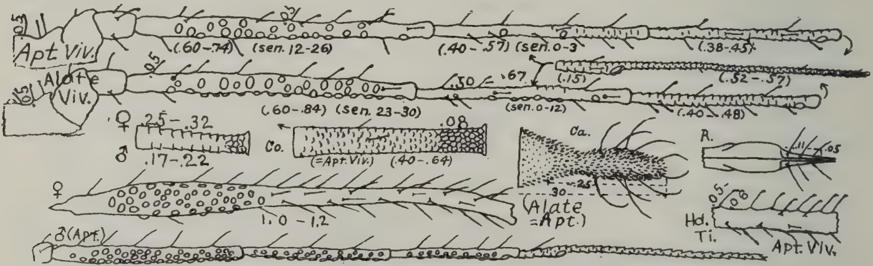

Fig. 364. *Macrosiphum frigidae*

Alate Vivipara. Head and thorax black; otherwise same as apterous vivipara except as follows: Dark areas at bases of dorsal hairs hardly evident in cleared specimens; antenna 2.5-2.9; rostrum not surpassing 2d coxa; hairs on hind tibia .04-.05.

Ovipara. Apterous. Color same as in apterous vivipara or more brownish or olive-green. Body length 2; antenna 1.9-2.3; cornicle .25-.32; cauda .18-.20 on median line, .25-.28 on side; hind tibia with proximal half swollen to about twice diameter of narrowest portion and bearing numerous sensoria.

Male. Apterous. Dark olive-green or brown; legs dusky yellowish; antenna, cornicle and cauda black. Body length 1.4; antenna about 1.8-2; hind tibia 1.2; cornicle .22, reticulated area .05 and in appearance approaching imbrication; cauda .10-.13 on median line, .15-.18 on side.

Egg. Newly laid, pale sordid greenish yellow; later, black.

Collections. On leaves and tender stems of *Artemisia frigida* and *A. borealis.* Throughout region. Fundatrices May 27, apterous and alate viviparae May 16 to Oct. 10, sexuales Sept. 27 to Nov. 1; very common.

Chief Distinguishing Characters. Usual presence of one or two hairs on cornicle, short reticulated area (.08) on cornicle, length of cornicle (not exceeding antennal IV but exceeding length of cauda), number of sensoria on III (12-26 in apterous vivipara, 23-30 and tuberculate in alate vivipara), body color (dark metallic green with entire cornicle, cauda and anal plate black), and length of unguis (shorter than III).

Macrosiphum frigidicola (Gillette and Palmer)

(Plate III, 5-9)

Macrosiphoniella frigidicola Gillette and Palmer, 1928:3.
Macrosiphum frigidicola, Gillette and Palmer, 1934:180; Knowlton and Allen, 1938c:81.

Fundatrix. Same in color as summer apterous vivipara but somewhat stouter in form and shorter in appendages. Size 1.6 by 1; antenna 1.6, III .45, IV .28, V .28, VI .12+.37, sensoria 3-4 on III; hind tibia .95. Otherwise same as summer apterous vivipara.

Apterous Summer Vivipara. Bluish green; slightly brownish on head; powdery; cauda and anal plate slightly dusky; tibiae brownish yellow; cornicle dusky except at base; antenna dusky except base of III. Body length 1.60-1.70; across eyes .46; hind tibia 1.26-1.85; hind tarsal II .17; antenna 2.10-2.6; rostrum acute, tip beyond hairs needlelike, long hairs present on IV, attaining abdominal I. Hairs blunt or slightly capitate; on hind tibia .05-.06; on side of abdomen .04-.05. Cauda spatulate, rather broad, bearing 3-5 lateral pairs of hairs and 2-3 single dorsal ones.

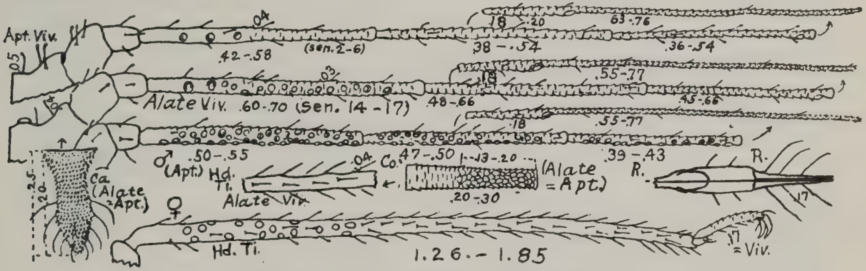

Fig. 365. *Macrosiphum frigidicola*

Alate Vivipara. Head and thorax dusky; abdomen bluish green; pulverulent; antenna except base of III, cornicle except base, rostrum beyond base of II and entire tibiae blackish to black; cauda and anal plate dusky. Body length 1.86-2.3; sensoria on antenna 14-17 on III; rostrum attaining 3d coxa. Hairs blunt. Otherwise as in apterous vivipara except as figured.

Ovipara. Apterous. Same as apterous summer vivipara except as follows: Body length 2.1, width .86, more elongate; cauda broader and pinkish; proximal third of hind tibia slightly swollen and bearing about 16 large, flat sensoria.

Male. Apterous. Light yellowish brown, dark on head and prothorax; cauda dusky brown; all other appendages dusky to blackish. Body length 1.5, width .51; hind tibia 1.2; antenna 2.3; cornicle .15.

Egg. Newly laid, pale greenish yellow; later, shining black. Size .66 by .30.

Collections. On leaves of *Artemisia frigida* and *A. tridentata* and *Eurotia lanata.* Colorado: Boulder, Idaho Springs, Bellvue, Poudre Canyon, Masonville, Livermore and Fort Collins. Idaho: Castleford. Fundatrix May 30, apterous summer viviparae June 6 to Oct. 4, alate viviparae May 27 to Sept. 19, sexuales Oct. 4 to 21; rather rare, scattered and difficult to observe on account of protective coloration.

Type. U.S.N.M., No. 41971. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Short cornicle (hardly longer than cauda), comparatively long reticulated area (over half the length of cornicle), glaucous green body with black cornicle and dusky cauda and anal plate, number of sensoria (14-17 on III of alate vivipara, 2-6 in apterous vivipara), length of unguis (2-3 times as long as cornicle) and slightly swollen proximal third of hind tibia which bears only about 14 sensoria.

Macrosiphum gaurae Williams

Nectarophora **sp. Cowen (in Gillette and Baker), 1895:124, line 14.**
Siphonophora gaurae **Williams, 1910:79.**
Macrosiphum gaurae, **Davis, 1911b:29; Gillette and Palmer, 1934:181.**

Fundatrix. Same as apterous vivipara except as follows: Body length 2.10; hind tibia 1.60; antenna 2; cornicle .58-.60 with reticulated area .10; cauda .35 on median line, .40 on side and bearing 3-4 lateral pairs of hairs; rostral IV+V .15.

Apterous Summer Vivipara. Pale yellow-green or mottled pink with head yellowish; cornicle pale with dusky tip. Antenna dusky beyond near tip of III; legs, cauda and anal plate pale. Body length 2.8-3.3; across eyes .52-.56; hind tibia 2.2; antenna 2.5-3.4; rostrum surpassing 2d coxa. Hairs slightly capitate; on side of abdomen .03-.04. Cauda tapering, without constriction bearing 4-5 pairs of lateral hairs 1-2 dorsal preapical ones.

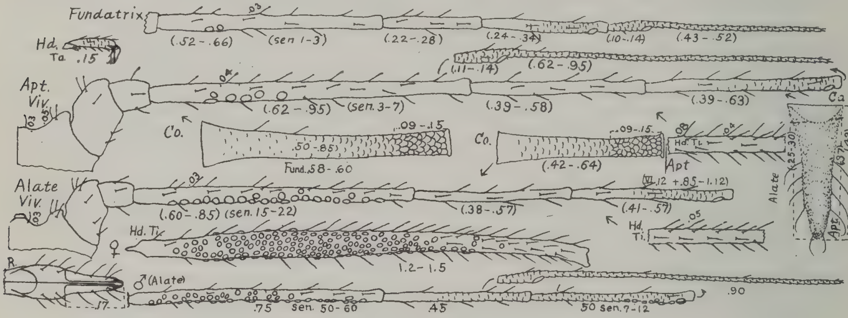

Fig. 366. *Macrosiphum gaurae*

Alate Vivipara. Head and thorax pale brown; abdomen mottled pink or green; antenna dusky beyond base of III; cornicle and tibiae pale or brownish with blackish tips; cauda and anal plate pale; tarsi black. Body length 2.2-3; hind tibia 1.85-2. Otherwise as in apterous vivipara except as figured.

Ovipara. Apterous. Pale yellowish green or bright pink; appendages brownish yellow with tips of antennal IV and V and entire VI and tips of tibiae black; cornicle pale with blackish tip; cauda pale; hind tibia brown, slightly swollen on proximal half to two-thirds which portion bears numerous sensoria. Body length 2-2.5; hind tibia 1.2-1.5; antenna 2-2.5; cornicle .40; cauda .20 on median line, .25 on side.

Male. Alate. Color in uncleared specimens mounted in balsam appears same as in alate vivipara. Body length 1.80; across eyes .48; hind tibia 1.55; antenna 2.55; cornicle .43, reticulated area .10; cauda .15 on median line, .20 on side, bearing 3-4 pairs of lateral hairs and usually a single dorsal preapical one.

Egg. Newly laid, pale yellowish to whitish; later, shining black. Size .80 by .35.

Collections. On leaves of *Gaura parviflora* and *Oenothera strigosa.* Throughout region. Fundatrices April 28, apterous summer viviparae April 1 to Sept. 29, alate viviparae May 22 to Nov. 3, sexuales Oct. 10 to Nov. 3; common.

Chief Distinguishing Characters. Green or pink body, cornicle length (less than antennal III), occasional presence of hairs on cornicle, length of reticulated area on cornicle (.12-.15), number of lateral hairs on cauda (about 4 pairs), number of sensoria on III (3-7 in apterous, 15-22 in alate vivipara) and rather long hairs on hind tibia (.05-.08) in apterous summer vivipara.

Macrosiphum glabrum Gillette and Palmer

(Plate III, 3-4)

Macrosiphum glabrum Gillette and Palmer, (March) 1928 and 1934:182; Smith and Knowlton, 1937b:271.

Apterous Summer Vivipara. Shamrock green, shining; sometimes dusky areas at bases of dorsal hairs in 6 rows; head dusky; rostrum especially III and IV, entire cornicle and legs beyond middle of femora black; cauda and anal plate dusky yellow; antenna black, paler on I, II and base of III. Body length 1.8-2.3; across eyes .52; hind tibia 1.6-2; antenna 2.6-3.5; rostrum attaining 3d coxa. Cauda tapering, or with slight constriction near base, bearing 3-4 lateral pairs of hairs. Hairs slightly capitate; on side of abdomen .04-.05.

Alate Vivipara. Head and thorax yellowish brown; otherwise as in apterous vivipara except as follows: Rostrum attaining 2d coxa, hairs on abdomen and .04 differences as shown in figure.

Ovipara. Cleared and mounted specimens same as apterous vivipara in dark markings. Body length about 2; hind tibia 1.35; antenna 1.85-2.5; cornicle .30-.40, reticulated area .15-.18. Hind tibia slightly swollen on proximal third which portion bears 2-22 flat sensoria more or less irregular in size and often in shape.

Male. Apterous. Green; with dark markings as in apterous vivipara. Body length 1.40-1.50; hind tibia 1.35-1.50; antenna 2.70-2.80, III .60-.70, IV .56-.65, V .46-.50, VI .19+.50-.70, sensoria on III and IV numerous, on V only a row along posterior side; cornicle .24, with reticulated area .10; rostral IV+V .11, surpassing 2d coxa; cauda .15 on median line, .20 on side.

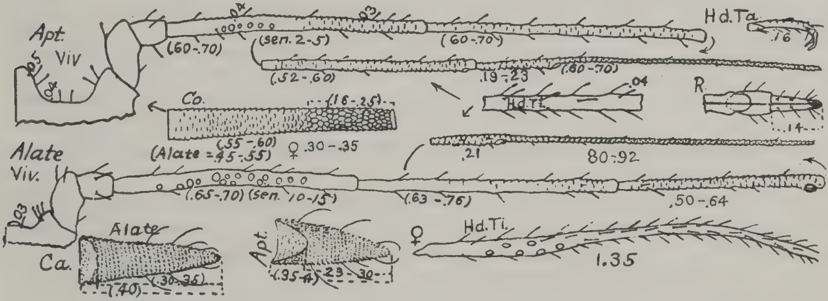

Fig. 367. *Macrosiphum glabrum*

Collections. On leaves and flower heads of *Artemisia aromatica.* Colorado: Cherokee Park, Livermore, Eggers, Skyway, Gateway and Fort Collins; on *Chrysothamnus viscidiflorus.* Utah: Nioche. Apterous summer viviparae July 28 to Oct. 19, alate viviparae May 17 to July 30, oviparae Sept. 23 to Oct. 19; rare and difficult to find due to scattered locations or solitary habit and protective coloration.

Type. U.S.N.M., No. 41970. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Sensoria on III weak and irregular in size and few in number (2-5 in apterous, 10-15 in alate vivipara), length of unguis (coequal or slightly shorter than III), reticulated area on cornicle unusually long (third or more of length of cornicle), shining shamrock-green body, rather short cauda (.23-.30 on median line in apterous and .30-.35 in alate vivipara) and small number of sensoria (about 6) on hind tibia of ovipara.

M. alatavicum Nevsky (May, 1928a:182) on the same host plant is very close and possibly synonymous but the description differs in more numerous sensoria and shorter unguis. However, these differences may prove to be variations in the same species.

Macrosiphum granarium (Kirby)

The English Grain Aphid

Aphis granaria Kirby, 1798:238.
Siphonophora granaria, Buckton, 1876:114; Pergande, 1904:14.
Macrosiphum granarium, Phillips, 1916:463; Theobald, 1926:71; Gillette and Palmer, 1934:182.

Apterous Summer Vivipara. Grass-green, sometimes yellow or pink, brown on head, frequently with dusky dorsal blotch on abdomen; entire cornicle and antenna dusky to black; cauda, anal plate and tibiae pale. Body length 1.9-2.5; hind tibia 1.35-1.9; antenna 2.6-3.3; rostral IV+V very broad and blunt, half as broad as long, tip attaining beyond 2d coxa. Hairs pointed to blunt; on side of abdomen .02-.03. Cauda spatulate, rather slender, bearing 3-4 pairs of lateral hairs and two dorsal preapical ones.

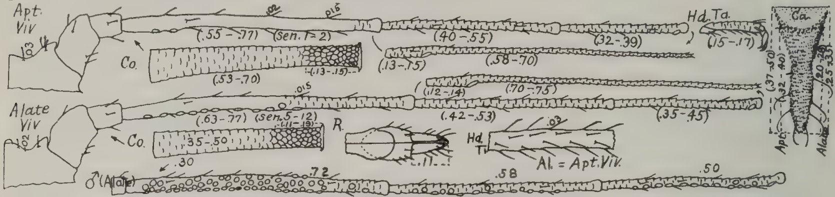

Fig. 368. *Macrosiphum granarium*

Alate Vivipara. Head and thoracic lobes yellowish brown; abdomen grass-green or pink, with darker green on median line and lateral areas and without dorsal blotch. Otherwise as in apterous vivipara except rostrum hardly attaining 2d coxa.

Male. Alate. Same in color as alate vivipara or more brownish. Body length 1.60-2; antenna 2.9, sensoria numerous on III, 16 on IV, 12 on V; hind tibia 1.33; cornicle .30.

Collections. On leaves and heads of oat, rye, barley, wheat, *Elymus* sp., *Heracleum* sp., *Linum* sp. and Kentucky bluegrass *(Poa pratense).* Throughout region. Apterous and alate summer viviparae May 8 to Nov. 8, males Sept. 16 and Oct. 26; common.

Chief Distinguishing Characters. Grass-green or pink body with frequent dorsal blotch in apterous and darker median line in alate vivipara, short broad rostral IV+V (width at base equalling length), comparatively short cornicle (shorter than III), length of reticulated area on cornicle (extending fourth to third length of cornicle), rather short, spatulate cauda (on median line 2-3 times, or in aptera occasionally 4 times, length of rostral IV+V), small number of sensoria on III (7-12 in alate vivipara, 1-2 in aptera).

Macrosiphum idahoensis Miller

Macrosiphum idahoensis Miller, 1933:249; Palmer, 1936b:745.

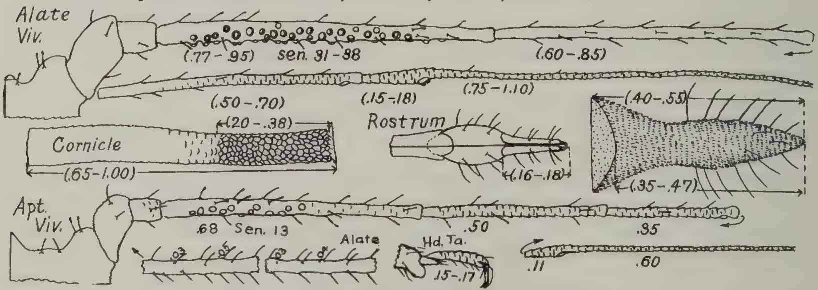

Fig. 369. *Macrosiphum idahoensis*

Apterous Summer Vivipara. Light green to creamy white; appendages brown except cauda which is green. Body length 2.32; across eyes .48; antenna 2.5; hind tibia 1.5; rostrum attaining 3d coxa. Cauda tapering to rather acute point but with construction near base and bearing 6-7 pairs of lateral hairs and about 3 dorsal ones.

Alate Vivipara. Head and thorax light brown; abdomen and appendages as in apterous vivipara. Body length 2.6-3; across eyes .50-.55; antenna 2.9-4.1; hind tibia 1.83-2.6; rostrum surpassing 3d coxa. Otherwise as in apterous vivipara except as figured..

Collections. On leaves and flower stems of *Anaphalis subalpina.* Colorado: Cameron Pass. Idaho: Lookout Pass. Alate and apterous viviparae Aug. 3 and 25.

Type. F. W. Miller Collection, No. S-A III.

Chief Distinguishing Characters. Pale green to creamy white body, rather long rostral IV+V (.16-.18), length of unguis (longer than III), length of cornicle (longer than unguis), extent of reticulation on cornicle (.20-.38) and absence of blunt to capitate dorsal hair or hairs near tip of cauda.

Macrosiphum jonesi Gillette and Palmer

Macrosiphum jonesi Gillette and Palmer, 1928:7 and 1934:183; Knowlton and Allen, 1938c:81.

Apterous Summer Vivipara. Black; shining; cauda dusky; cornicle and appendages except base of antennal III black. Body length 2.3; hind tibia 1.3; antenna 2.6-3; rostrum attaining nearly to 3d coxa. Frontal tubercles poorly developed, not greatly exceeding vertex. Hairs capitate; on side of abdomen .04-.05. Cornicle bearing 1-4 hairs. Cauda spatulate, blunt at tip and bearing about 4-5 pairs of lateral hairs and 2 preapical ones.

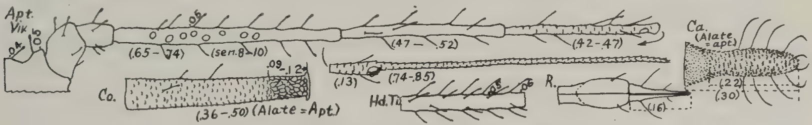

Fig. 370. *Macrosiphum jonesi*

Alate Vivipara. Secondary sensoria on III 18-20; other characters as in apterous vivipara.

Collections. On leaves of *Artemisia cana, A. tripartita* and *A. vulgare.* Colorado: North Park and Sargent. Wyoming: Chimney Rock (near Jelm). Utah: Bryce Canyon, Hanna, Ogden, Wolf Creek, Fielding and Woodland. Idaho: Blue Gulch. Apterous summer viviparae May 20 to Oct. 22, alate viviparae July 26; apparently very rare, or host plant rarely observed.

Type. U.S.N.M., No. 41467. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. This species belongs to the *coweni-filifoliae* complex which is very peculiar on account of the weak Aphislike frontal tubercles combined with the large Macrosiphumlike cauda, cornicle and antenna. The hairs are slightly capitate and unusually long for *Macrosiphum* thus resembling *Kakimia.*

From the other species of this complex this form is distinguished as follows: Length of cornicle comparatively short (.36-.50 and shorter than antennal IV), long unguis (about twice length of cornicle), moderately numerous sensoria on III (8-10 in apterous and 18-20 in alate vivipara).

Macrosiphum katonkae (Hottes)

Adactynus katonkae Hottes, 1933 (Feb.):13 and 1948a:30.
Macrosiphum katonkae, Gillette and Palmer, 1934:184; Hottes, 1948a:30.

Apterous Summer Vivipara. Green; cornicle dusky brown except base; cauda dusky yellow; antenna dusky beyond proximal half of III; tibiae dark brown. Body length 2.74-2.85; across eyes .53; hind tibia 2.45; antenna 3.5-4.2; rostrum attaining 2d coxa. Hairs slightly capitate; on side of abdomen .04. Cauda tapering and slender, bearing 3-4 pairs of lateral hairs and a single dorsal one some distance before tip; hairs near tip straight and sometimes capitate.

Alate Vivipara. Head and thorax green to dusky; otherwise same as apterous vivipara except as figured.

Ovipara. Apterous. Same as apterous vivipara except as follows: Cauda .40 on median line, .50 on side and hind tibia with nearly the proximal half slightly swollen and bearing numerous sensoria.

Male. **Apterous. Same as apterous vivipara except length about 2, antenna as figured and cauda, .25 on median line, .30 on side.**

Collections. On leaves of *Aster laevis* and *Brickellia grandiflora.* Colorado: Red Cliff, Glade Park and Whitewater. Apterous summer viviparae Aug. 10 and 31, alate viviparae Aug. 10; not common.

Type. U.S.N.M.

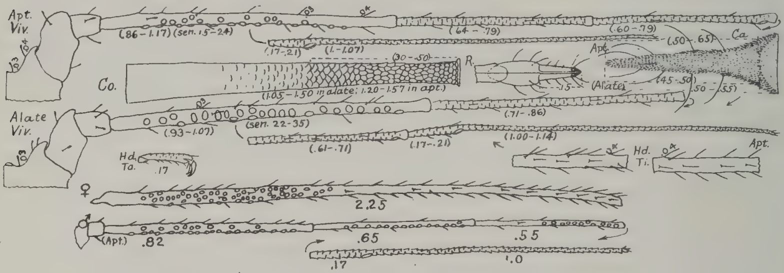

Fig. 371. *Macrosiphum katonkae*

Chief Distinguishing Characters. Cornicle length (greater than that of antennal III or unguis in both alate and apterous viviparae), length of cauda (3-4 times length of rostral IV+V), green body, long reticulated area on cornicle (.30-.50), long antenna (3.5-4.2), length of cornicle, large size (body length nearly 3; distance across eyes .54) and apterous condition of male.

Macrosiphum kiowanepum (Hottes)

Adactynus kiowanepus **Hottes, 1933:14.**
Macrosiphum kiowanepum**, Gillette and Palmer, 1934:184.**

Apterous Summer Vivipara. **"Bluish with reddish tinge, sometimes green; pruinose"; antenna black beyond base of III; cauda and anal plate brownish; tibiae and cornicle except base blackish. Body length 2.6-2.7; across eyes .60; antenna 3.7-4.3; rostrum attaining or surpassing 2d coxa. Hairs slightly capitate; on side of abdomen .03-.04. Cauda tapering, rather slender, bearing 4-5 pairs of lateral hairs and a single dorsal preapical one.**

Alate Vivipara. **Same as apterous vivipara except abdomen with dusky lateral areas and hairs slightly shorter and differences figured.**

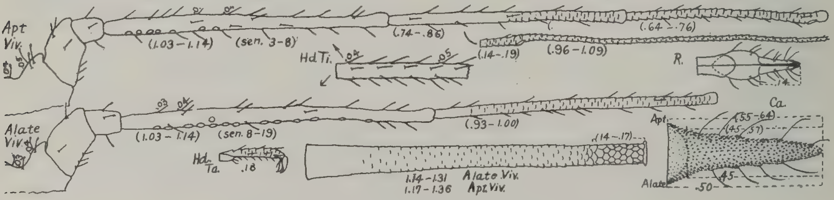

Fig. 372. *Macrosiphum kiowanepum*

Collections. On *Geum ciliatum, Pentstemon* sp., *Quamasia hyacinthia* and *Zygadenus* sp. Colorado: Grand Mesa. Apterous and alate viviparae July 26; rare.

Type. U.S.N.M. Paratypes, Colo. Agr. Exp. Sta. and Hottes. Collections.

Chief Distinguishing Characters. Bluish or green to reddish body, length of cornicle (equal to or longer than antennal III), length of reticulated area of cornicle (.14-.17, seventh to eighth of length of cornicle and hardly longer than rostral IV+V), small number of sensoria on III (3-8 in apterous and 8-19 in alate vivipara), and unusually long hind tarsal II (.18, exceeding length of rostral IV+V).

Separation of this form from *M. valerianae* appears, at present, impossible. However, on account of the radical difference in host plants *kiowanepum* is here retained as distinct awaiting further biological evidence of synonymy with *valerianae*.

This form is very close to *M. pseudorosae*, apparently differing only in the slightly longer cornicle which is usually longer than or at least equal to antennal III while in *pseudorosae* cornicle is usually shorter than or at most equal to III.

Macrosiphum longirostris Gillette and Palmer

Macrosiphum longirostris **Gillette and Palmer, 1933:360 and 1934:186.**

Apterous Summer Vivipara. **Light green without dark markings; antenna beyond base of III, tips of tibiae, tarsi and distal third of cornicle dusky; cauda pale to slightly dusky. Body length 2-3; across eyes .46; hind tibia 1.55-1.75; antenna 2.4-2.6; rostrum attaining 3d coxa or abdomen. Secondary sensoria strongly convex but hardly tuberculate. Hairs on vertex and antenna slightly capitate or blunt; on sides of body slightly capitate, .03 long. Cauda slender, tapering to acute point, bearing 4 pairs of lateral hairs and 1-2 dorsal hairs, about 4 of the terminal ones blunt to slightly capitate.**

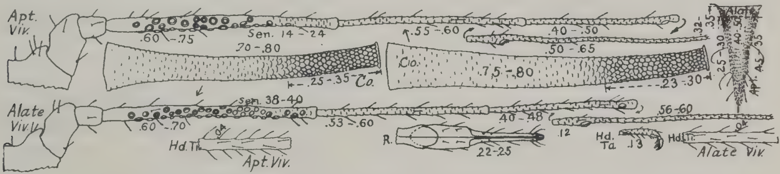

Fig. 373. *Macrosiphum longirostris*

Alate Vivipara. **Head and thorax brown; abdomen light green without markings; antenna beyond base of III, cornicle beyond proximal one-fifth, rostral IV+V and legs beyond middle of femora black; cauda and anal plate pale green. Body length 2-3; across eyes .44; hind tibia 1.60-1.75; antenna 2-3. Otherwise as in apterous summer vivipara.**

Collections. On head and underside of leaves of *Cirsium filipendulum*. Colorado: Fort Collins. Apterous and alate viviparae July 28 and Sept. 5; apparently not common.

Type. U.S.N.M., No. 49289. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Long rostral IV+V (.24, twice as long as base of antennal VI or hind tarsal II), tapering, acute cauda with straight capitate hairs near tip, long reticulated area (.25-.35) on the cornicle, numerous sensoria on III and light green immaculate body.

Macrosiphum ludovicianae (Oestlund)

The Dark-leaved Wormwood Aphid

Siphonophora ludovicianae **Oestlund, 1886:23.**
Nectarophora ludovicianae, **Oestlund, 1887:80.**
Macrosiphum ludovicianae, **Soliman, 1927:117; Hottes and Frison, 1931a:315; Gillette and Palmer, 1934:187; Knowlton and Allen, 1938c:81.**

Fundatrix. **Same as summer aptera except as follows: Antenna 2.4; cornicle .50 with reticulated area .20; cauda .30 on median line.**

Apterous Summer Vivipara. **Yellowish slate-green or pale grape-green; slightly pulverulent; antenna greenish to dusky on I, II and base of III, blackish or black beyond base of III; tarsi, rostrum beyond middle of II, especially on IV+V, and cornicle beyond dusky base black; cauda and anal plate yellowish to dusky; tibiae blackish. Body length 2-2.5; across eyes .45-.50; hind tibia 1.65-1.75; antenna about 4; rostrum attaining 3d coxa. Hairs slightly capitate to blunt; on side of body .06. Cauda spatulate, bearing 7-8 lateral pairs of hairs and 4-5 dorsal ones.**

Alate Vivipara. **Head and thorax dusky green; otherwise as in apterous summer vivipara as described above except hairs slightly shorter and differences shown in figure.**

Ovipara. **Apterous. Similar to apterous vivipara except often more pinkish on body. Proximal half of hind tibia slightly swollen, hardly twice diameter of narrowest portion and rather thickly covered with numerous sensoria.**

Male. **Alate. Head and thorax yellowish brown; abdomen yellowish olive-green to yellow-brown. Measurements as in alate vivipara or slightly smaller. Antenna with numerous sensoria on III and IV and a row along posterior edge of V.**

Collections. On leaves of *Artemisia vulgaris, A. ludoviciana, A. ludoviciana* subsp. *typica, Eurotia lanata* and *Tanacetum* sp. Throughout region. Fundatrices Mar. 16, alate and apterous summer viviparae June 20 to Oct. 16, sexuales Oct. 15 to 26; common.

Type. Lost, according to Hottes and Frison (1931a:315).

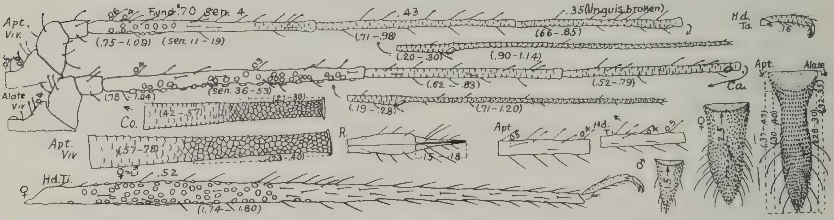

Fig. 374. *Macrosiphum ludovicianae*

Chief Distinguishing Characters. Glaucous green body, long reticulated area on cornicle (.23-.40, about half length of cornicle), cornicle length (shorter than antennal III, hardly as long as V but distinctly longer than cauda), numerous sensoria on III and on hind tibia of ovipara, numerous hairs on cauda, pale color of cauda and anal plate and acute but not needlelike rostral IV+V in length coequal with hind tarsal II.

This species is very close to *M. tanacetaria* (Kaltenbach) and *M. artemisiae* Boyer de Fonscolombe but differs according to description by Theobald (1926: 161 and 164) and from apterous specimens determined by Hille Ris Lambers as follows: Color of cauda, anal plate and head (not black), sensoria on III (more numerous than 5-7 except in fundatrix) and length of cornicle (distinctly longer than cauda).

Macrosiphum macrosiphum (Wilson)

The Long-legged Serviceberry Aphid

Illinoia macrosiphum Wilson, 1912a:155.
Macrosiphum macrosiphum, Gillette and Palmer, 1934:188; Hottes, 1949a:45.

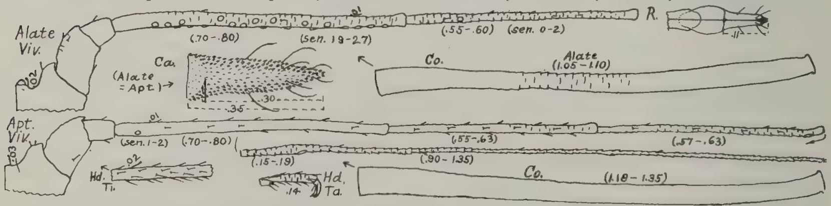

Fig. 375. *Macrosiphum macrosiphum*

Apterous Summer Vivipara. **Head light to medium amber-yellow; remainder of dorsum green to yellow; cauda and anal plate pale; tip of rostrum, cornicle beyond proximal fifth which is sordid yellow and antenna beyond base of III dusky to blackish; tibiae brownish, darker at knees and tips. Body length 1.5-1.9; across eyes .39-.43; hind tibia 1.5-1.8; antenna 3-3.8; rostrum attaining 2d coxa. Hairs slightly capitate; on side of abdomen .01. Cornicle often with slight suggestion of enlargement on distal third, without reticulation, sometimes bearing a few inconspicuous hairs. Cauda parallel-sided to tapering, bearing 2 lateral pairs and 3-4 dorsal or dorsolateral hairs.**

Alate Vivipara. **Same as apterous vivipara except as follows: Rostrum hardly attaining 2d coxa and hairs slightly shorter also differences as figured.**

Ovipara. Apterous. Same as summer apterous vivipara except as follows: Body sometimes pink or reddish; proximal third to half of hind tibia slightly swollen and bearing numerous sensoria; cauda .25 on median line.

Male. Alate. Head and thorax brown; abdomen yellow with broken bands on IV, V and VI; spots on remaining segments and lateral areas dusky; antenna, beyond base of III, cornicle, anal plate, tarsi and tips of tibiae dark. About the same as alate vivipara in structure and measurements except as follows: Sensoria numerous on III, 17-22 on IV, 10-19 on V; cornicle .90; cauda .15 on median line, .20 on side.

Collections. On leaves of *Amelanchier alnifolia* and *Sambucus canadensis.* Colorado: Bellvue, Log Cabin (west of Livermore), Mesa, Aspen and Grand Mesa. Utah: Mount Timpanogos. Apterous and alate viviparae June 30 to Aug. 4, apterae to Aug. 24; sexuales Sept. 14 to Oct. 4; rare.

Chief Distinguishing Characters. Pale green to yellow body, absence of reticulation on cornicle, number of sensoria on III (1-2 in aptera and 19-44 in alate vivipara), short rostral IV+V (shorter than hind tarsal II), small number of lateral hairs on cauda (2-3 pairs), long cornicle 1-1.50, longer than antennal III and about twice length of IV).

Measurements differing from those given above and found in some apterous examples were as follows: III .80-.90, IV .75-.84, V .75-.80, VI .18-.20+1.25; cornicle 1.50. Sensoria on III of alate vivipara numbered 29-44 in specimens described by Hottes (1949a:45). The status of this form is uncertaain.

Macrosiphum martini (Cockerell) n. comb.

Nectarophora martini Cockerell, 1903a:169.

Apterous Vivipara. Nymph. "Reddish; pruinose; not tuberculate." *Adult.* "Dark wine-red; shiny"; with dusky areas about bases of dorsal hairs; antenna, cornicle, tarsi and tips of tibiae black; cauda and anal plate pale. Body length 2.5-3; across eyes .54, antenna 4.10; hind tibia 2-2.5; rostrum attaining 3d coxa. Cauda with 5-7 hairs on each side.

Alate Vivipara. "Dark plum color; shining, with piliferous tubercles," cornicle and appendages except base of antennal III black; cauda and anal plate pale. Body length 3; across eyes .50; antenna about 4; hind tibia 2.30; rostrum attaining between 2d and 3d coxae. Cauda slightly constricted near base, slender and bearing about 7 hairs on each side.

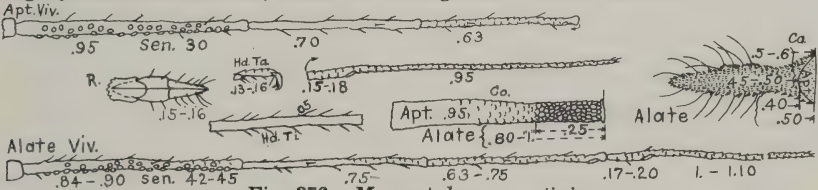

Fig. 376. *Macrosiphum martini*

Collections. On *Eriogonum* sp., *Frasera speciosa, Helenium hoopsi, Ligusticum* sp., *Potentilla* sp. and *Zygadenus nuttalli.* New Mexico: Beulah. Alate and apterous viviparae July 26 to Aug. 4.

Type. U.S.N.M.

Data for above description obtained by study of type specimens (one alate vivipara from *Eriogonum* and nymphs) and paratypes (2 alate and 3 apterous viviparae from *Helenium*) and from description by Cockerell.

Chief Distinguishing Characters. Dark red to plum body in adult and the pruinose covering in young, length of reticulated area on cornicle (seventh to nearly third length of entire cornicle), number of sensoria on III (over 40 in alate and about 30 in apterous vivipara), length of antennal III (.80-.95) and length of cornicle (about same as III).

The alatae, including the holotype seem practically inseparable from *M. ambrosiae,* but since the hosts differ and no transfer tests have been made the species is here left distinct awaiting further study.

It seems strange that the same species should occur on such a variety of hosts but the specimens from other hosts than *Eriogonum* and *Helenium* seem not to be available for examination. Two apterae on the paratype slide belong to another species.

Macrosiphum mentzeliae Wilson

Nectarophora **sp. Cowen (in Gillette and Baker), 1895:124, line 36.**
Macrosiphum mentzeliae **Wilson 1915a:99; Gillette and Palmer, 1934:188.**

Apterous Summer Vivipara. Head pale yellowish; body medium to pale green sometimes pink; with reddish dorsal blotch; cauda and anal plate pale; cornicle dusky to blackish beyond proximal half; appendages pale, becoming dusky at tips. Body length 2.5-3; across eyes .50; hind tibia 1.8-2; hind tarsal II .13; antenna 2.5-3; rostrum attaining 2d coxa. Hairs slightly capitate; on side of abdomen .04. Cauda parallel-sided to tapering, rather stout, bearing 4 pairs of lateral and one preapical dorsal hair.

Alate Vivipara. Head pale brownish yellow; thoracic lobes yellowish brown; prothorax and abdomen medium to pale green with reddish dorsal blotch; antenna beyond base of III, terminal segments of rostrum, cornicle beyond proximal third which is dusky, tarsi and tips of tibiae black; cauda and anal plate pale. Otherwise same as apterous summer vivipara except as follows: Body length 2.3-2.8; rostrum attaining hardly to 2d coxa and hairs slightly shorter.

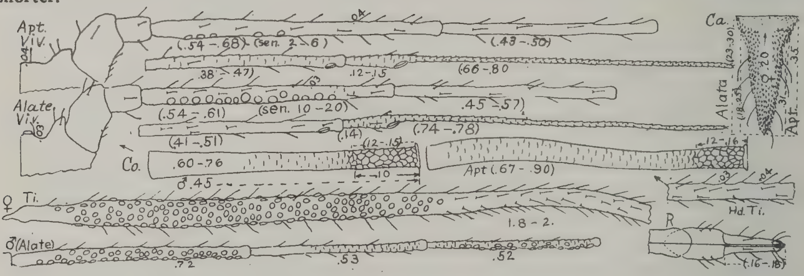

Fig. 377. *Macrosiphum mentzeliae*

Ovipara. Apterous. Pinkish yellow to pale green, darker on dorsum of abdomen; antenna beyond base of III, cornicle at tip, tarsi, tips of 1st and 2d tibiae and entire hind tibia blackish; cauda and anal plate pale yellowish to pinkish. Measurements same as in apterous summer vivipara except that cauda is shorter, .20 on median line. Proximal two-thirds of hind tibia slightly swollen and thickly covered with convex sensoria.

Male. Alate. Head and thorax dark brown; abdomen yellowish brown with dark dorsal crossbands and lateral areas; appendages as in alate vivipara. Body length about 2; cauda .15 on median line.

Collections. On leaves of *Mentzelia* sp. Colorado: Fort Collins. Utah: Logan. Apterous summer viviparae May 26 to Oct. 8, alate viviparae June 2 to Oct. 12, males Oct. 2 to 12, oviparae Oct. 11 to 25; rather common.

Type. Granovsky Collection.

Chief Distinguishing Characters. Body color (light to medium green often with pink dorsal blotch or sometimes pink in general), length of cornicle (equal to antennal III or slightly longer), relatively short cauda (less than half length of cornicle), length of hairs on hind tibia (hardly equal to diameter of tibia), short extent of reticulation on cornicle (about fifth of length of cornicle), rather long rostral IV+V (.16-.18, slightly longer than hind tarsal II) and number of sensoria on III (2-3 in apterous and 12-20 in alate vivipara).

Macrosiphum mertensiae Gillette and Palmer

Macrosiphum mertensiae **Gillette and Palmer, 1933:361 and 1934:189.**

Apterous Summer Vivipara. (Mounted on slide), pale throughout body, anal plate and cauda; legs pale except distal ends of tibiae and entire tarsi which are dusky; cornicle pale with distal third slightly dusky; antenna pale with distal portion of IV and entire V and VI dusky; rostrum pale with only tip dusky. Body length 2-3; across eyes .50-.53; hind tibia

2-2.4; antenna 3.4-4, secondary sensoria rather large, often nearly half the diameter of III; rostrum attaining 2d coxa. Hairs blunt to slightly capitate; on side of abdomen .03. Cauda tapering, without definite neck bearing 4 pairs of lateral and 2 dorsal hairs.

Alate Vivipara. Same as apterous vivipara except as figured.

Collections. On leaves of *Mertensia* sp. Colorado: Colorado Springs and Roggin. Alate and apterous summer viviparae May 13 and June 19; apparently rare.

Type. U.S.N.M., No. 49290. Paratypes, Colo. Agr. Exp. Sta. Collection.

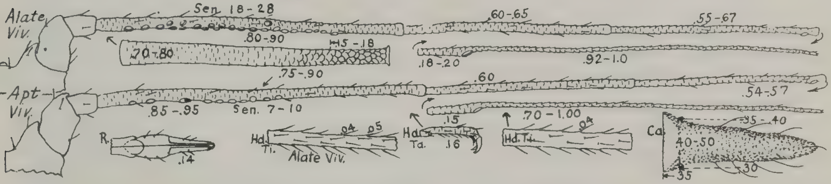

Fig. 378. *Macrosiphum mertensiae*

Chief Distinguishing Characters. Length of cornicle (shorter than III but longer than IV, not shorter than .70 and longer than width across eyes), number of sensoria on III (in alate vivipara 18 or more, in aptera 7 or more), length of cauda (not exceeding half length of cornicle), length of reticulation on cornicle (not exceeding .18 mm or seventh to fifth of length of cornicle), hairs on cauda (4 lateral pairs) and length of rostral IV+V (.13-.14, slightly shorter than base of antennal VI or hind tarsal II).

Macrosiphum nigromaculosum Macdougall

The Black and Red Rose Aphid

Macrosiphum nigromaculosum Macdougall, 1926:168; Gillette and Palmer, 1934:190.

Fundatrix (possible not this species). Entire body and antennal I chestnut-brown with black crossband on abdominal VI, traces of black ring about each cornicle base, and median spot on abdominal V; antennal II, III+IV coalesced and base of V pale yellow, remainder black; tibiae pale yellow with tips black; cornicle and tarsi black; cauda pale; anal plate brown. Body length 2.70; hind tibia 1.2; hind tarsal II .07; across eyes .50; antenna 1.25, III+IV coalesced .42-.50, V .20-.25, VI .15+.30; cornicle .35, reticulated area .05; cauda .20 on median line, .27 on side; rostral IV+V .12; cornicle expanded at base to twice the diameter of the portion just back of flange, covered with heavy imbrications. Cauda tapering, without distinct neck and bearing 4 pairs of lateral hairs and a single dorsal one. ***Fundatrigenia. Nymph.*** Light red or rose-brown with head slightly dusky; abdomen marked with dark around each cornicle base and across dorsum of VI as in fundatrix; cornicle brown; appendages pale yellow; tarsi dusky.

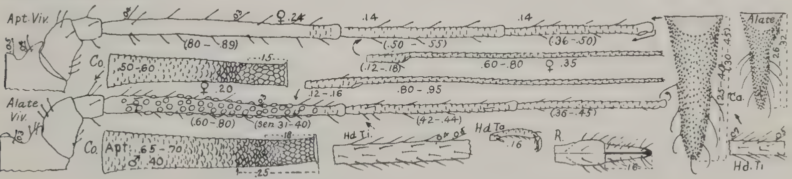

Fig. 379. *Macrosiphum nigromaculosum*

Apterous Summer Vivipara. Body length 3; hind tibia 2.15-2.50; antenna 3-4. Ocular tubercle large. Lateral tubercles shallow. Hairs on vertex capitate or pointed; on side of abdomen blunt, .04 long. Cauda tapering, bearing 3-5 lateral and dorsolateral hairs on each side. Cornicle not greatly enlarged at base, hexagonal reticulations extending .15 from apex then transverse elongate reticulations or closed imbrications to .25 mm from tip and rather heavy imbrications on remainder. Body truncate posteriorly and cornicles held at right angles to body. This habit, together with the striking color pattern, gives the species a very distinctive appearance.

Alate Vivipara. Head and thorax black; abdomen mahogany-red to Mars-orange, with black band across V and VI and broken white intersegmental lines between all segments; cauda and legs except tips of segments yellow; tarsi, tips of tibiae and entire cornicle black; antennal I and II blackish, remainder dusky; fore wing dusky at tip between radial sector and media I. Body length 2-2.5; across eyes .55; hind tibia 1.5-1.9; antenna 3; rostrum attaining 2d coxa. Otherwise as in apterous summer vivipara.

Ovipara. Apterous. Deep pink or red-ochre with head and band across abdominal IV, V and VI blackish; appendages mostly brownish; cornicle brownish at base becoming black distally; cauda and anal plate pale. Body length 1.8; hind tibia .70; hind tarsal II .09; antenna 1.05, III .24, IV .14, V .14, VI .07+.35; cornicle .20; cauda .15 on median line; rostral IV+V .10. Proximal half of hind tibia slightly swollen and bearing sensoria.

Male. Alate. Color similar to alate vivipara. Body length about 2; hind tibia 1.40; hind tarsal II .14; cornicle .40, reticulated area, hexagonal to .10 then closed imbrications to .15 from tip; cauda .12 on median line, .15 on side, width at base almost equal to length. Antenna as in alate vivipara except for the presence of about 14 sensoria on V.

Collections. On leaves and stems of cultivated rose. Colorado: Manitou and Log Cabin (west of Livermore). Utah: Lonetree. Fundatrix (possibly not this species) June 19, apterous summer viviparae June 25 and July 9, alate viviparae July 9 to Aug. 21, oviparae Sept. 12, male Aug. 21; rare.

Cotype. Alice P. Macdougal Collection, Univ. of Brit. Columbia, Canada.

This species is peculiar in showing radical differences in the fundatrix and ovipara in length of appendages and rostral IV+V, unless indeed the examples here described as such belong to another species. No life history work was done with these forms.

Chief Distinguishing Characters. Striking body color (reddish with black bands on abdomen, black cornicle and yellow legs), sensoria on III numerous on alate vivipara and absent on aptera, rather slender cauda, bearing 4-5 pairs of lateral hairs, sculpture on cornicle and rather long hairs on hind tibia.

The identification of this species was aided by the study of Miss Macdougall's specimens, loaned by G. I. Spencer of the University of British Columbia. The statement in original description that cornicle is "reticulated throughout" is inaccurate, as her specimens show the same amount and character of reticulation as the Colorado examples and they also show hind tarsal II length .15 instead of .20 as given in the description.

Macrosiphum niwanistum (Hottes)

Adactynus niwanista **Hottes, 1933:16.**
Macrosiphum niwanistum**, Gillette and Palmer, 1934:191; Hottes, 1948a:29.**

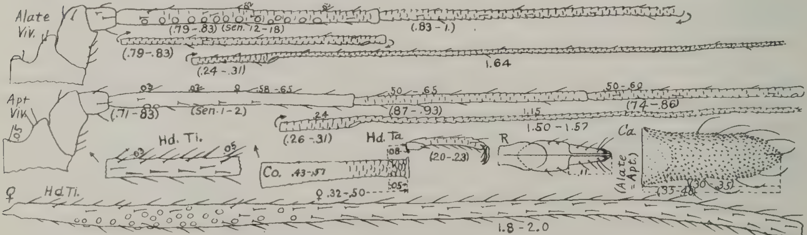

Fig. 380. *Macrosiphum niwanistum*

Apterous Summer Vivipara. Light green; pulverulent; cornicle pale with dusky tip; cauda, anal plate and tibiae except tips pale; antenna dusky beginning with tip of V; rostral III and IV+V, tips of tibiae and entire tarsi dusky or brown. Body length 2.8; across eyes .65-".70"; hind tibia 2.8; antenna 4.3-4.8; rostrum attaining between 2d and 3d coxae. Hairs blunt or pointed; on side of abdomen .05. Lateral tubercles present on pronotum. Cornicle with faint reticulations about 4 rows from tip. Cauda broad, somewhat spatulate, bearing 2 lateral and 2 dorsolateral pairs of hairs and a single dorsal preapical one.

Alate Vivipara. Head and thorax brown; abdomen light green with lateral areas and 2 indistinct dorsal bands dusky; pulverulent; antenna beginning with tip of III, tip of cornicle, tips of tibiae and entire tarsi dusky; tibiae and cornicle except tips, cauda and anal plate pale; wing veins slightly bordered. Body length 2.2; across eyes about .70-".76"; otherwise as in apterous vivipara.

Ovipara. Apterous. (Cleared and mounted), dusky portions same as in apterous vivipara. Body length 2.8; hind tibia 1.8-2; antenna 3.50. Cauda .22-.25 on median line. Proximal third of hind tibia slightly swollen and bearing scattered flat sensoria.

Collections. On leaves of *Mertensia* sp. and Solomon's seal (*Smilacina* sp.). Colorado: Grand Mesa and in Rocky Mountain National Park. Apterous summer viviparae Aug. 4 and 24, alate viviparae Aug. 22, oviparae Aug. 24 to Sept. 23; rare.

Type. U.S.N.M. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Pale green body, covered with pulverulence and with more or less of dorsal bands on abdomen of alate vivipara, small number of sensoria on III, short cornicle (but slightly more than half of antennal III), faint large reticulations on cornicle, long hind tarsal II and base of antennal VI and short rostral IV+V (about half of the length of hind tarsal II) and comparatively short cauda with not more than 10 hairs.

Macrosiphum pelargonii (Kaltenbach)

The Geranium Aphid

Aphis pelargonii Kaltenbach, 1843:21.
Macrosiphum cornelli Patch (in Griswold), 1926:334 (alatiforms); Griswold, 1927:91 (biology and host plants); Gillette and Palmer, 1934:174.
Macrosiphum pelargonii, Gillette and Palmer, 1934:192.
Acyrthosiphon malvae Mosley, Hille Ris Lambers, 1947:234 (questionable synonymy).

Apterous Summer Vivipara. Grape-green; legs pale brownish; cauda dusky green; cornicle pale with brownish tip; antenna dusky. Body length 2-2.3; across eyes .46-.52; hind tibia 1.5-2; antenna 2.5-3.3; rostrum nearly attaining 3d coxa. Hairs blunt to slightly capitate; on side of abdomen .02-.03. Cornicle imbricated, without reticulation but often showing faint transverse striae next to flange. Cauda tapering, rather stout, hardly showing neck and bearing 3-5 pairs of lateral hairs with one or two dorsal preapical ones.

Alate Vivipara. Same as apterous vivipara except as follows: Body length 1.5-2; rostrum attaining 2d coxa.

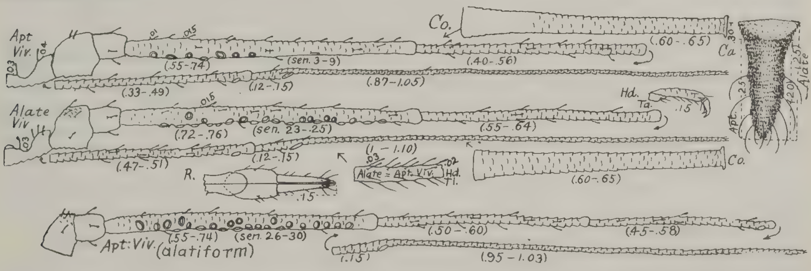

Fig. 381. *Macrosiphum pelargonii*

Collections. On leaves of *Pelargonium* sp. Colorado: Boulder and Fort Collins. Apterous summer viviparae July, Sept., Nov., March and May, alate viviparae Feb. 22 to May 28; mostly in greenhouses.

This species apparently differs from *M. pelargonii* only in the less numerous sensoria on III in typical apterae. Hille Ris Lambers (1947:234) finds some apterae, "alatiform," with numerous sensoria and others with few sensoria in the same colonies.

Chief Distinguishing Characters. Lack of reticulation on cornicle, long unguis (about 1.6-2 times IV, 1.5 times III), immaculate green body, short cauda (.20-.25 on median line), bearing 3-5 pairs of lateral hairs and length of rostral IV+V (about same as hind tarsal II).

Some (Hille Ris Lambers, 1947a:234 and Hottes, 1930:182) have considered *M. pelargonii* Kaltenbach as a synonym of *Aphis malvae* Mosley but Mosley places his species under the heading which says "cornicle shorter than abdomen." This hardly fits even the subtribe Macrosiphina and certainly not this species.

Macrosiphum pisi (Kaltenbach)

The Pea Aphid

Aphis pisum Harris, 1782:66.
Aphis onobrychis Boyer de Fonscolombe, 1841:169.
Aphis pisi Kaltenbach, 1843:23.
Macrosiphum pisi, Davis, 1915: Bul. 276 (complete account and synonymy); Theobald, 1926:127; Gillette and Palmer, 1934:193.
Acyrthosiphon pisum (Harris), Hille Ris Lambers, 1947a:247.

Apterous Summer Vivipara. Pale green; cauda and appendages pale; tarsi and tips of tibiae black; cornicle pale becoming blackish distally. Body length 3-3.5; across eyes .55-.64; hind tibia 2.3-2.8; rostrum nearly attaining 2d coxa. Hairs slightly capitate; on side of abdomen .01. Cornicle slender, diameter less than that of hind tibia and without reticulation. Cauda tapering, bearing 3-5 pairs of lateral hairs and one or two dorsal preapical ones; hairs near tip slightly capitate.

Alate Vivipara. Head and thorax yellow-brown; otherwise as in apterous vivipara. Body length 2.3-2.7; across eyes .54; hind tibia 1.7-2; antenna 3.1-3.5; rostrum nearly attaining 2d coxa.

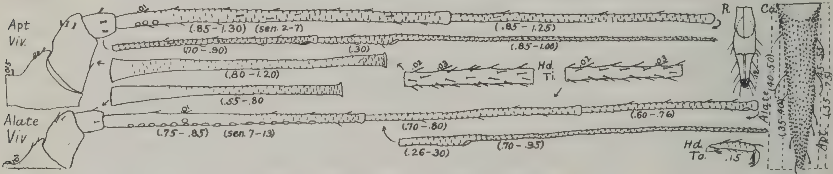

Fig. 382. *Macrosiphum pisi*

Collections. On leaves and stems of Loco *(Astragalus* sp.), *Lathyrus odoratus,* alfalfa *(Medicago sativa),* sweet clover *(Melilotus* sp.), peas *(Pisum sativum),* clover *(Trifolium* sp.). Throughout region. Alate and apterous summer viviparae Mar. 22 to Nov. 23; common and injurious.

Chief Distinguishing Characters. Pale green body, lack of reticulation on cornicle, tapering, rather acute cauda with blunt to capitate hairs on terminal portion, short rostral IV+V (shorter than hind tarsal II), length of cornicle (not longer than antennal III) and length of hind tarsal II (shorter than base of antennal VI).

Hille Ris Lambers (1947a:247) considers the American form as a different subspecies namely *M. destructor* (Johnson) on account of the males in Europe being apterous while those in America are reported, according to him to be alate. However, Davis (1915:276) mentions occasional apterous males. Theobald (1926:127) describes both apterous and alate males. Kaltenbach's name is here retained on account of usage, especially in the economic field.

Macrosiphum pseudorosae Patch

Nectarophora pallida Oestlund, 1887:84 (preoccupied).
Macrosiphum pseudorosae Patch, 1919:206; Palmer, 1936b:746.

This species so resembles *M. solanifolii* that drawings and full description seem useless repetition, accordingly it seems best to give only the points which differ. These characters are as follows: Heavy black cornicle and appendages, longer antenna in apterous vivipara, III 1.05-1.20, IV .76-.87, V .80, VI .20+1.20; in alate vivipara, III 1.03, IV .95-1.00, V .95, VI .22+1.25) and cornicle never longer than III.

Collections. On leaves of wild rose, *Agrimonia striata, Eriogonum alatum,* and *Senecio uintahensis.* Colorado: Log Cabin (west of Livermore), Boulder and Grand Junction. Utah: Brighton, Almaga,-City Creek, Emigration Canyon, Big Cottonwood Canyon and Granite. Idaho: Emigration Canyon and Boise. Alate and apterous viviparae June 6 to July 20; rare.

Macrosiphum purshiae Palmer

Macrosiphum purshiae Palmer, 1938:356.

Apterous Summer Vivipara. Entire dorsum medium green, either slightly frosted or shining; antennal I and III, cauda and femora brown, all other parts of appendages black. Body length 2-2.5; antenna 4.15; hind tibia 2.10-2.80. Hairs blunt; on proximal half of antennal III .05 long. Cornicle imbricated, not reticulated. Cauda elongate, tapering, with scarcely any tendency to constriction at base, bearing three hairs on each side. Rostral IV+V triangular, almost, acute, hardly attaining 3d coxa.

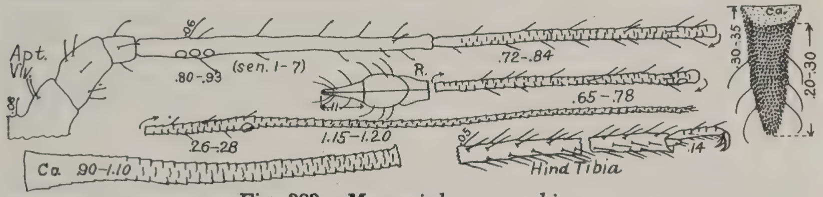

Fig. 383. *Macrosiphum purshiae*

Collections. On leaves and stems of *Purshia tridentata.* Colorado: Bellvue. Apterous viviparae Sept. 3 and Oct. 8; rare.

Type. U.S.N.M., No. 52352. Paratypes, Colo. Agr. Exp. Sta. Collection.

This species resembled *M. pisi* but differs as follows: Shorter, broader cauda, longer hairs, black color of appendages and length of unguis (longer than III).

Genotype *Macrosiphum rosae* (Linnaeus)

The Rose Aphid

Aphis rosae Linnaeus, 1758:452 and 1761:260.
Siphonophora rosae, Buckton, 1876:103.
Nectarophora rosae, Oestlund, 1887:81.
Macrosiphum rosae, Essig, 1911c:550; Theobald, 1926:65; Soliman, 1927:119; Gillette and Palmer, 1934:171.

Apterous Summer Vivipara. Body pale green; appendages as in alate vivipara. Body length 2.50-3.50; hind tibia 2.35-2.85; antenna 3.2-3.8; rostrum attaining between 2d and 3d coxae. Hairs blunt. Cornicle cylindrical, often wider at base. Cauda with slight neck, bearing 3-5 pairs of lateral hairs and 2 preapical ones.

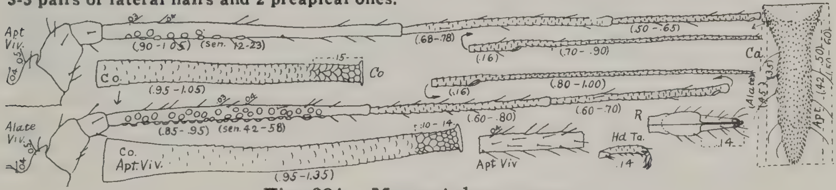

Fig. 384. *Macrosiphum rosae*

Alate Vivipara. Head and thorax black; abdomen pale green with black lateral areas; cauda pale; appendages, cornicle and rostral IV+V black. Measurements and other characters as in apterous vivipara except as figured.

Male. Alate. Head and thorax black; abdomen rusty yellow with black dorsal dashes and lateral areas; antenna and cornicle black; tibiae and cauda dusky. Body length 2; hind tibia 2; antenna 3.33, sensoria present on III and V.

Collections. On leaves and twigs of cultivated rose. Throughout region. Apterous summer viviparae May 22 to Nov. 15, alate vivipara June 17 to Nov. 27, males Nov. 1; fairly common.

Chief Distinguishing Characters. Rather numerous sensoria on III (in aptera 12-23, in alata 42-58) and black head, thorax, antenna, cornicle and rostral IV+V.

This species is recorded by Linnaeus, Theobald and Patch as having a pink variety but this has not been noted in Rocky Mountain collections.

Macrosiphum rudbeckiae (Fitch)

The Coneflower or Goldenglow Aphid

Aphis rudbeckiae Fitch, 1851:66.
Macrosiphum rudbeckiae, Essig, 1911a:400; Soliman, 1927:124; Hottes and Frison, 1931a:320; Gillette and Palmer, 1934:193.

Fundatrix. First Instar. Dull brick-red with dusky or brownish on head and abdomen; cornicle and appendages brown to dusky. *Adult.* Body length 2.50; hind tibia 2; antenna 2.5, III .70-.75, IV .49-.50, V .46-.50, VI .17+.45-.51, sensoria 8 on III; cornicle .50, reticulated area .12; cauda .43 on median line, .50 on side. Otherwise as in apterous summer vivipara.

Apterous Summer Vivipara. Blood-red; shining; hair bases without dark areas in adult but present in young; cauda and anal plate pale reddish; tibiae brownish yellow with tips black; rostral III and IV+V and tarsi black; cornicle yellow-brown on proximal half, dusky to black on distal half; antenna dusky to black beyond base of III. Body length 3.7-4.5; across eyes .60; hind tibia 2.8-2.9; antenna 4.5; rostrum attaining 3d coxa. Hairs blunt; on side of abdomen .05-.07. Cauda tapering, acute and with slight neck, bearing about 8 hairs on each side and 3-6 dorsal ones.

Alate Vivipara. Head and thorax red (slightly brownish in cleared specimen); abdomen blood-red; shining; antenna beyond base of III, cornicle beyond proximal third, tibiae, especially distal half, rostral III and IV+V and entire tarsi black; cauda and anal plate pale reddish. Body length 3-3.70. Hairs blunt; on side of abdomen .03-.04. Otherwise as in apterous vivipara.

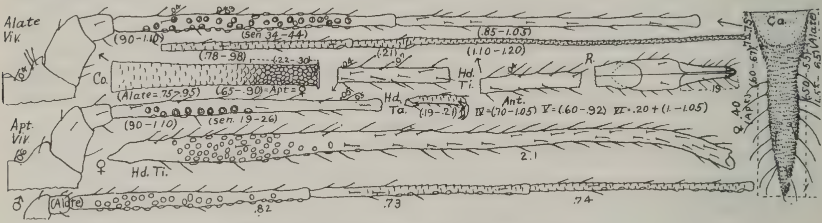

Fig. 385. *Macrosiphum rudbeckiae*

Ovipara. Apterous. Same as apterous summer vivipara or somewhat smaller; cauda about .40 on median line. Proximal fourth to third of hind tibia slightly swollen and covered with numerous sensoria.

Male. Alate. Yellowish red, including head and thorax; antenna beyond II, cornicle, tibiae, tarsi and rostral III, and IV+V black or blackish; cauda pale. Body length 2-2.50; hind tibia 1.85-2; antenna about 4; sensoria numerous on III, few and scattered on IV and V; cornicle .39 with reticulated area .10; cauda .25 on median line.

Collections. On stems of *Rudbeckia laciniata* and *R. hirta*. Throughout region. Fundatrices May 11 to May 24; apterous and alate summer viviparae June 10 to Sept. 24, sexuales Sept. 17 to Nov. 9; very common, in large colonies, injurious and unsightly.

Cotypes. U.S.N.M.

Chief Distinguishing Characters. Brick-red to blood-red body, with yellow legs in aptera and pale cornicle bases, numerous sensoria on III in viviparae, rather long reticulated area on cornicle, length of cornicle (not exceeding V), long cauda (over two-thirds of cornicle), numerous hairs on cauda, long rostral IV+V and hind tarsal II and sensoria on hind tibia of ovipara not extending as far as half of length of tibia.

Macrosiphum rudbeckiarum (Cockerell)

Cockerell's Green Goldenglow Aphid

Nectarophora rudbeckiarum Cockerell, 1903a:168.
Macrosiphum rudbeckiarum, Hottes, 1949:47 (misidentification).

Apterous Vivipara. **"Light green"; appendages pale except as follows: Antenna beginning with tip of III, tarsi, tips of tibiae and of cornicle, rostral III, and IV+V dusky. Body length 2.80-3.50; .53 across eyes; antenna 5-5.20; hind tibia 3.4; rostrum attaining between 2d and 3d coxae. Hairs on vertex and body slightly capitate to blunt or apparently pointed; on antennal III and hind tibia blunt to pointed, about same length as diameter of segment bearing them. Cauda slightly tapering to cylindrical (distorted on cotype slide).**

Alate Vivipara. **Color and measurements same as in aptera described above.**

Collections. On *Rudbeckia laciniata* and *R. montana.* New Mexico: Beulah. Apterous and alate viviparae July 26; rare.

Cotypes. U.S.N.M.

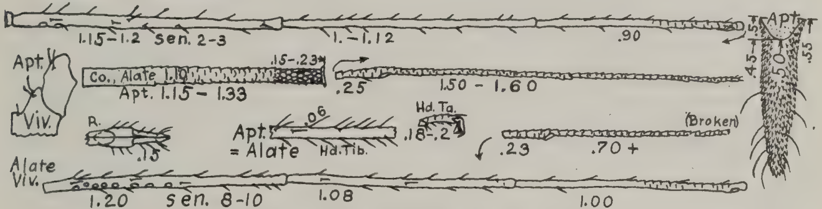

Fig. 386. *Macrosiphum rudbeckiarum*

Chief Distinguishing Characters. Light green body, length of the reticulated portion of the cornicle (not equalling more than fifth nor less than seventh of the entire length of cornicle), number of sensoria on III (not exceeding 10) in alate or apterous viviparae, length of rostral IV+V (.14-.16, considerably shorter than base of VI and not longer than hind tarsal II), length of cauda (about .50), number of hairs on cauda (5-7 on each side) and length of antenna (not shorter than 5). Data for description and figure obtained from original description and cotypes.

Macrosiphum sanborni Gillette

The Chrysanthemum Aphid

Macrosiphum chrysanthemi **(Oestlund) (misidentification), Sanborn, 1904:73.**
Siphonophora chrysanthemicolens **Williams, 1891:8 (nomen nudum).**
Macrosiphum sanborni **Gillette, 1908b:65; Davis, 1911b:28; Gillette and Palmer, 1934: 194.**
Macrosiphoniella sanborni, **Theobald, 1926:149.**

Apterous Summer Vivipara. **Amber-brown to black posteriorly; shining; cauda, anal plate, rostrum, tarsi and cornicle black; antenna except III dusky to blackish; tibiae yellow except knees and tips which are blackish. Body length 1.6-2; across eyes .35-.40; hind tibia 1-1.24; antenna 1.7-2.2; rostrum attaining nearly to 3d coxa. Hairs pointed; on hind tibia .06-.07; on side of abdomen .06-.09. Cornicle enlarged at base to over twice diameter of distal portion, with reticulation extending over more than half of the length of cornicle. Cauda spatulate, bearing 4-7 hairs on each side and a single preapical dorsal one.**

Alate Vivipara. **Same as apterous vivipara except as follows: Hairs on side of abdomen .04.**

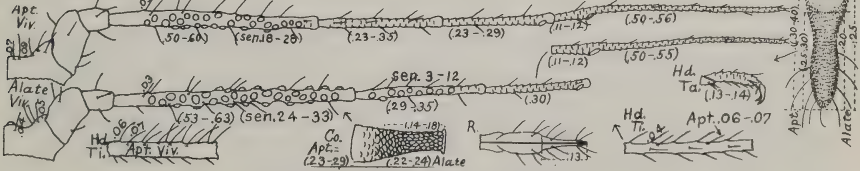

Fig. 387. *Macrosiphum sanborni*

Collections. On leaves and tender stems of chrysanthemums both in greenhouses and outdoors. Colorado: Grand Junction, Boulder, and Fort Collins. Alate and apterous viviparae all months of the year in greenhouses; rather common, often injurious.

Type. U.S.N.M., No. 41945. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Brown to black body with cauda, anal plate and entire cornicle black, peculiar shape of the cornicle and long extent of the reticulated area (more than half of the length of cornicle, rather numerous convex sensoria on III (24-33 on alate and 18-28 on apterous vivipara), short length of cornicle (not exceeding length of cauda) and length of unguis (not exceeding length of III).

Macrosiphum sibiricum (Mordvilko)

Acyrthosiphon (Microlophium) sibiricum Mordvilko, 1914:224 and 226.
Macrosiphum schranki Theobald, (misidentification), Gillette and Palmer, 1934:195.

Apterous Summer Vivipara. Pale green, to yellowish or pinkish, with dark green stripes on median line; cauda and anal plate pale; cornicle and rostrum pale with dusky tip; legs pale with tips of tibiae blackish; antenna pale to tip of III then brownish to dusky. Body length 3.3-3.8; across eyes .60; hind tibia 2.6-2.9; antenna 4.6-5; rostrum attaining 3d coxa. Hairs blunt to slightly capitate; on side of abdomen .02-.03. Cornicle slender, imbricated, with about 2 rows of indistinct striae just before flange. Cauda tapering, acute, bearing 3 pairs of lateral hairs and a single preapical one.

Alate Vivipara. (Mounted on slide), dark parts are as follows: Traces of lateral areas on abdomen in some, entire cornicle, antenna beyond base of III, rostral III and IV+V and tibiae especially at tips. Cauda and anal plate pale. Otherwise as in apterous vivipara.

Ovipara. Apterous. Pale green, some with tinge of pink and with dark green median line; antenna pale with tips of III, IV and V and entire VI blackish; hind tibia and cornicle pale with blackish tips, cauda and anal plate pale. Body length 2.90; antenna 4.2, III .95, IV .85, V .70, VI .18+1.35, sensoria 2-6 on III; hind tibia 2.5; proximal third slightly swollen and rather sparsely covered with scattered sensoria.

Male. Apterous. Sordid yellowish or pinkish with middle dorsal portion of meso- and metathorax and abdomen anterior to cornicles blackish; tibiae brownish with black tips; cauda and anal plate sordid yellow. Body length 1.5-2; antenna 3.2-4; cauda .17 on median line.

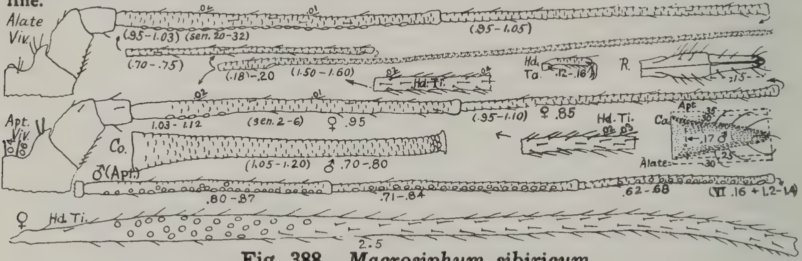

Fig. 388. *Macrosiphum sibiricum*

Collections. On leaves and stems of *Urtica gracilis.* Throughout region. Apterous summer viviparae May 24 to Oct. 26, alate viviparae June 24 to July 24 and Sept. 10, oviparae Sept. 10 to Nov. 7, males Sept. 10 to Oct. 27; rather common.

Chief Distinguishing Characters. Pale green or pinkish body with darker median stripe, and pale appendages, slender cornicle lacking definite reticulations, short cauda with only 3 pairs of lateral hairs, long antennal IV (about equal to III), rather few sensoria on III (20-32), length of hairs on hind tibia (shorter than .04-.06), presence of sensoria on III, IV and V in male antenna, and apterous condition of male.

Macrosiphum solanifolii (Ashmead)

The Potato Aphid (Plate VIII)

Siphonophora euphorbiae and *S. euphorbicola* Thomas, 1877:6.
Siphonophora solanifolii Ashmead, 1882:92.
Nectarophora asclepiadis Cowen (in Gillette and Baker), 1895:123.
Nectarophora heleniella Cockerell, 1903a:168.

Macrosiphum solanifolii, Patch, 1907:235 and 1911:81; Gillette and Palmer, 1934:195.
Macrosiphum gei (Koch), (misidentification or disputed synonymy), Theobald, 1926: 108; Hottes and Frison, 1931a:306; Hille Ris Lambers, 1933:170 (discussion of synonymy).
Macrosiphum euphorbiae, Gillette and Palmer, 1934:178; Hille Ris Lambers, 1939:84.

Fundatrix. Medium green with head yellowish; all appendages pale with tips of antennal segments and of cornicle and tibiae dusky. Cauda pale to sordid. Body length 3; hind tibia 1.60; antenna 2; cauda .35 on median line, .40 on side.

Apterous Summer Vivipara. Pink or pale green; cauda and legs pale, with tips of tibiae dusky; tarsi black; antenna pale with tips of III, IV, V and entire VI dusky; cornicle pale with dusky tip. Body length 2.8-3; across eyes .50-.55; hind tibia 2.2-2.3; antenna 3-4; rostrum surpassing 2d coxa. Hairs blunt to silghtly capitate; on side of abdomen .03. Cauda tapering, without noticeable constriction and bearing 4-5 pairs of lateral hairs and 1-2 dorsal preapical ones.

Alate Vivipara. Same as apterous vivipara except as follows: Head and thoracic lobes pale yellowish; cornicle pale only at base; antenna pale only on I, II and base of III; tips of tibiae black.

Ovipara. Apterous. Same as apterous vivipara except as follows: Antenna mostly dusky; hind tibia blackish on slightly swollen proximal two-thirds which portion bears numerous sensoria; length of body 2.90; hind tibia 1.50-1.60; cauda .25 on median line, .30 on side; rostral IV+V .12.

Male. Alate. Head and thorax black; abdomen with dusky bands and lateral areas; antenna black beyond base of III, I and II lighter; cornicle and cauda dusky; legs sordid or brownish. Body length 1.80; hind tibia 1.90-2; antenna 3.50; cauda .13-.17 on median line, .17-.20 on side, bearing 4 pairs of lateral and frequently 2 pairs of dorsolateral hairs and one preapical one.

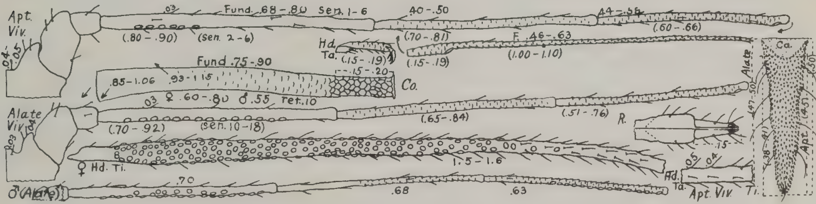

Fig. 389. *Macrosiphum solanifolii*

Collections. Winter hosts, on leaves and stems of *Rosa* sp., *Agrimonia* sp. and *Potentilla* sp. and possibly other Rosaceous plants; summer hosts, on leaves of *Amaranthus* sp., *Apocynum* sp., *Aquilegia* sp., *Armoracia* sp., *Asclepias speciosa, Castilleja* sp., *Cineraria* sp., *Cornus* sp., pumpkin and squash *(Cucurbita sp.), Echinocystis* sp., *Epilobium* sp., *Eriogonum alatum, Euphorbia marginata, Geranium* sp., *Gladiolus* sp., *Helianthus* sp., *Helichrysum* sp., *Humulus lupulus, Iva* sp., *Lactuca* sp., *Malva* sp., *Penstemon* sp., pea *(Pisum sativum), Polygonum* sp., poppy, potato, raspberry, *Radicula* sp., currant *(Ribes sp.), Rumex* sp., *Senecio* sp., *Sonchus* sp., and tulip. Throughout region. Fundatrices April 1 to 23 on rose; apterous summer viviparae May 12 to July 19 on rose; alate viviparae May 12 to July 19 and Oct. 24 on rose, May 13 to Nov. 4 on summer hosts (all months of the year in greenhouse); oviparae Oct. 20 to Nov. 1 on rose; males Oct. 13 to Nov. 19 on either host; very common.

Cotypes. Apparently lost. *S. euphorbiae* Thomas Ill. Nat. Hist. Surv. Collection.

Chief Distinguishing Characters. Length of reticulated area on cornicle (.15-.20, same length as hind tarsal II), number of sensoria on III (2-6 in apterous, 10-18 in single row in alate vivipara), length of rostral IV+V (.15), character of cauda (tapering and bearing 4 pairs of lateral and frequently 2 pairs of dorsolateral hairs).

This species has been declared synonymous with *M. gei* (Koch) by Theobald (op. cit.) but is considered distinct by Hille Ris Lambers (1939:83), with differences as follows: (Fewer caudal hairs (fewer than 12), length of unguis in summer viviparae (longer than III), length of tibial hairs (shorter than .07-.10) and appendages lighter in color (not blackish and not dusky).

Opinion as to synonymy was aided by study of specimens of *M. gei* determined by Hille Ris Lambers.

Macrosiphum sonchellum (Monell)

(Plate IV, 1-2)

Siphonophora sonchella Monell, 1879:21; Williams, 1910:83.
Siphonophora muralis Buckton (misidentification); Davis, 1911b:31; Theobald, 1926: 93 (discussion of status).
Macrosiphum williamsi Gillette and Palmer, 1929:468.
Macrosiphum sonchellum, Gillette and Palmer, 1934:196.

Apterous Summer Vivipara. Deep brownish red to brick-red, yellowish on head, pronotum and abdominal VIII; shining; tibiae, cauda and anal plate yellow; cornicle black; antenna dusky after base of III; knees, tips of tibiae and entire tarsi black. Body length 2-2.5; across eyes .48; hind tibia 1.66-2; hind tarsal II .16-.18; antenna 2.5-3.4; rostrum surpassing 2d coxa. Hairs blunt to slightly capitate; on side of abdomen .03-.04. Cauda tapering ending in rather acute point, bearing about 6-7 lateral and dorsolateral hairs on each side, and a dorsal preapical one; several of the terminal ones sometimes approximately straight and capitate.

Alate Vivipara. Head and thorax pale red. Otherwise same as apterous vivipara except differences as shown in figure.

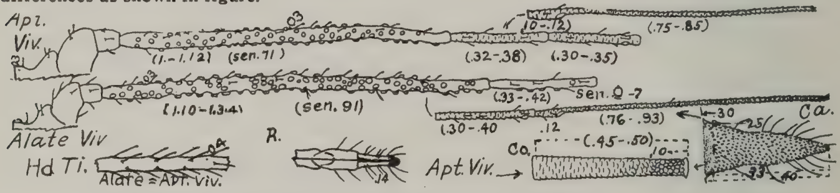

Fig. 390. *Macrosiphum sonchellum*

Collections. On leaves and stems of wild lettuce *(Lactuca* sp.*)*. Colorado: Masonville and Fort Collins. Apterous summer viviparae May 30 and July 6, alate viviparae May 30 and June 2; rare.

Type. Davis collection. *M. williamsi* U.S.N.M., No. 41924.

Chief Distinguishing Characters. Red body with yellow legs and cauda and black cornicle, numerous tuberculate sensoria on III in both alate and apterous viviparae and their presence on IV in alate and occasionally in apterous vivipara, short IV (only third length of III), short unguis (shorter than III), rather short rostral IV+V (hardly as long as hind tarsal II), length of cornicle (less than half of III) and short many-haired cauda.

Macrosiphum taraxaci (Kaltenbach)

The Dark Dandelion Aphid

Aphis taraxaci Kaltenbach, 1843:30.
Macrosiphum taraxaci, Theobald, 1926:97; Gillette and Palmer, 1934:197.

Fundatrix. Same as apterous summer vivipara except as follows: Body length about 2; hind tibia 1.2-1.5; antenna 2; cornicle .50-.55.

Apterous Summer Vivipara. Dark rusty brown, with large dusky areas at bases of hairs; cornicle, cauda, anal plate and appendages except bases of femora black. Body length 2.5-3; across eyes .50-.57; hind tibia 1.95-2.1 antenna 2.3-3.1; rostrum attaining 3d coxa. Hairs slightly capitate; on hind tibia .06-.08; on side of abdomen .05. Cornicle heavy, diameter at middle exceeding that of hind tibia. Cauda broad, tapering to slightly spatulate, bearing about 2-4 pairs of lateral and 1 dorsolateral pairs of hairs and a single dorsal preapical one.

Alate Vivipara. Head and thorax black; abdomen deep reddish brown, or appearing deep black to naked eye; all appendages including rostrum and anal plate black. Same in measurements as apterous summer vivipara except as follows: Antenna 2.5-3.4; rostrum attaining between 2d and 3d coxae and hairs slightly shorter.

Ovipara. Apterous. Same as apterous summer vivipara except as follows: Hind tibia 1.6-2, proximal half slightly swollen and bearing numerous scattered sensoria.

Male. Apterous. Color same as in forms described above. Body length 1.7; hind tibia 1-1.2; antenna 1.3-2; cauda .10 on median line.

Egg. Newly laid, pale yellow-green; later, shining black. Size .87 by .37.

Collections. On leaves and stems of *Taraxacum officinale*. Throughout region. Fundatrices April 3 to 29, apterous and alate summer viviparae May 6 to Nov. 17, oviparae Oct. 6 to Nov. 17, males Oct. 5 to Oct. 22; very numerous in large colonies on infested plants; common.

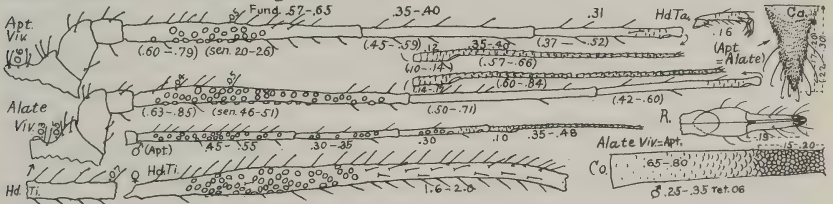

Fig. 391. *Macrosiphum taraxaci*

Chief Distinguishing Characters. Dark red-brown body with black appendages and anal plate, relatively short cauda, (but little longer on median line than hind tarsal II), rather long rostral IV+V (longer than hind tarsal II), numerous sensoria on III in both alate and apterous viviparae, long blunt to capitate hairs on hind tibia in both alate and apterous viviparae and length of reticulated area on the cylindrical to slightly tapering cornicle (.15-.20 long).

Macrosiphum tenuitarsis Gillette and Palmer

Macrosiphum tenuitarsis **Gillette and Palmer, 1933:363 and 1934:198.**

Apterous Summer Vivipara. Apple-green; cauda and anal plate pale green; cornicle black, paler at base; antenna with I, II and base of III pale, remainder dusky to blackish; tibiae and top of restrum dusky to blackish. Body length 2.5-3, slender; hind tibia 2.35-2.75; antenna 4-4.3, secondary sensoria circular, slightly convex, but not tuberculate. Cornicle coarsely and longitudinally reticulated to .18, finely and transversely reticulated to .25 or .27 from tip; rostrum obtuse, surpassing 2d coxa. Hairs on vertex blunt, on hind tibia pointed, about .04 long; on side of abdomen blunt. .04 long. Cauda parallel sided or with slight neck on proximal half and tapering on distal half ending with slender acute tip, bearing 5-6 lateral and dorsolateral hairs on each side and 2-6 dorsal ones.

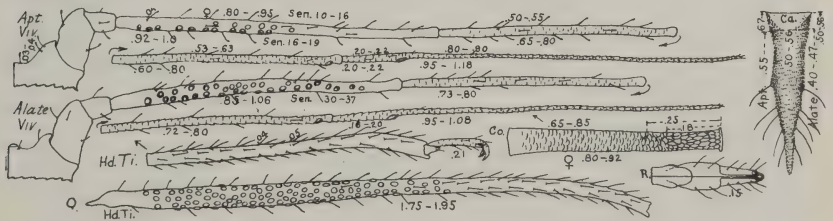

Fig. 392. *Macrosiphum tenuitarsis*

Alate Vivipara. Head, prothorax, meso- and metathorax yellowish brown; abdomen apple-green with dusky green on median line; cauda and anal plate pale greenish; other appendages black except antennal I and II and base of III pale, base of cornicle dusky and rostrum pale to dusky up to distal IV+V with black tip. Otherwise as in apterous summer vivipara except rostrum barely attaining 2d coxa.

Ovipara. Apterous. Color similar to apterous vivipara. Body length 2-2.5; antenna 2.9-3.2; cauda .40 on median line, .50 on side.

Male. **Alate. Head and thorax dark brown; abdomen yellowish brown; cauda and anal plate pale brownish; other appendages black except lighter on base of antennal III and of cornicle. Body length 1.65-2.2; hind tibia 1.8; antenna 3-3.33, III .75-.80, IV .53-.65, V .50-.60, VI .18+.60?-.85, sensoria 48-50 on III, 9-16 on IV and 10-18 on V; cornicle .30-.45, reticulations about .10-.15; cauda .12 on median line. Otherwise as in alate vivipara.**

Collections. On leaves of *Aster laevis* and *A.* sp. Colorado: Boulder, Bellvue, Poudre Canyon, Estes Park and Fort Collins. Apterous and alate summer viviparae July 15 and 16 and Aug. 2 and 4, sexuales Oct. 4 and 5; not common.

On *Chamaenerium angustifolium* occurs a form (*Nectarophora* sp. Cowen—in Gillette and Baker—1895:124, line 30 and *M. epilobii* Pergande, Gillette and Palmer, 1934:177, misidentification) apparently, structurally inseparable from the above-described species. Records are as follows: Colorado: Manitou and Fort Collins. Apterous summer viviparae June 30 and Sept. 18, alate viviparae Sept. 18; rare on this host, at least. As no transfer tests were attempted the status of this form is not proven.

Type. U.S.N.M., No. 49288. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Character. Long, slender hind tarsal II and base of antennal VI (longer than rostral IV+V), long cauda with slender tip and bearing about 13-16 hairs, apple-green body with pale cauda and anal plate and blackish cornicle and appendages, length of rostral IV+V (.14-.15), absence of sensoria on IV and fewer than 40 on III in alate vivipara, fewer than 20 in aptera, length of unguis (not shorter than III or than cornicle), length of cornicle and character of reticulation and alate condition of male.

Macrosiphum thermopsaphis Knowlton

Macrosiphum thermosaphis **Knowlton, 1938a:15.**

Apterous Vivipara. **"Green; pruniose." (Cleared and mounted on slide), body immaculate; antenna beyond middle of III, distal end of cornicle, tips of tibiae and of rostrum and entire tarsi black; cauda pale. Body length 3.50-5; across eyes .60-.70; antenna about 6; hind tibia 3-4-"4.40"; rostrum attaining between 2d and 3d coxae. Cauda rather broad, irregular parallel-sided to tapering, bearing 6-8 pairs of lateral and dorsolateral hairs and 1-2 single dorsal preapical ones. Hairs on body slightly capitate, marginal ones .05.**

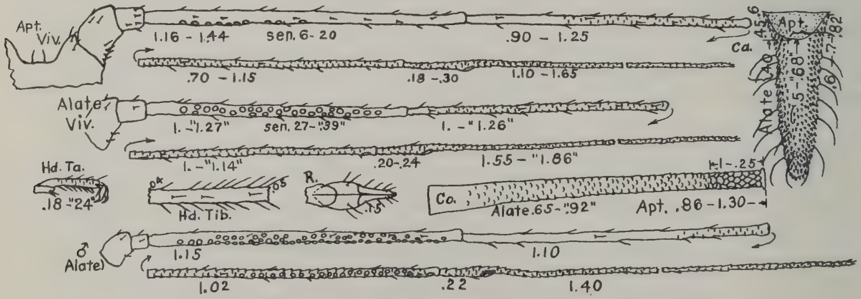

Fig. 393. *Macrosiphum thermopsaphis*

Alate Vivipara. **Color same as apterous vivipara or with darker portions more pronounced. Body length 2.90-"3.25"; across eyes .55-".66"; antenna 5.2-"6.20"; hind tibia "2.73"-3-"3.84"; otherwise same as apterous vivipara except as figured.**

Collections. On leaves and stems of *Thermopsis montana.* Colorado: Eldora Lake, Custer County and Pingree Park. Apterous viviparae June 24 to Aug. 24, alate viviparae and alate males Aug. 23; not common.

Type. U.S.N.M. Paratypes, Utah and Colo. Agr. Exp. Sta. and Knowlton Collections.

Chief Distinguishing Characters. Pale green, pruniose body with pale legs, number of sensoria on III (6-20 in apterous, 27-"39" in alate vivipara), long IV (nearly or quite as long as III), length of rostral IV+V (.14-.15), number of hairs (6-8 on a side) on cauda and short extent of reticulation on cornicle (.10-.15 rarely .25).

This species is close to *M. albifrons* and *M. zionensis*, differing in characters given in key.

Macrosiphum timpanogos Knowlton

Macrosiphum timpanogos Knowlton, 1942b:6.

Apterous Summer Vivipara. (Cleared and mounted on slide), body immaculate; antenna and cornicle pale, dusky distally; cauda pale; tarsi, tips of tibiae and of rostrum blackish. Body length 4-5; across eyes .70-.75; antenna nearly 6; hind tibia about 4-4.5; rostrum attaining between 2d and 3d coxae. Cauda somewhat spatulate, rather broad, bearing about 5 pairs of lateral hairs.

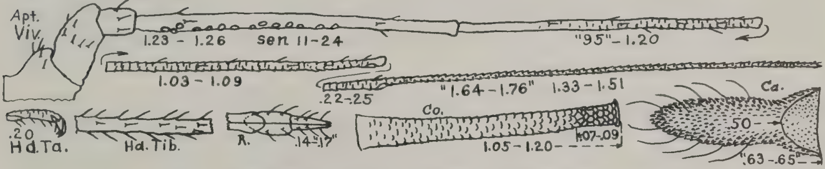

Fig. 394. *Macrosiphum timpanogos*

Collections. On "lupine (?)." Utah: Hidden Lake Camp, Mount Timpanogos. Colorado: Eagle. Apterous summer viviparae, July 23 to Aug. 13; not common.

Chief Distinguishing Characters. Number of sensoria on III of aptera, length of cornicle, length of antenna, length of cauda, extent of reticulated area on cornicle and pale cornicle.

This species is doubtfully distinct from *M. thermopsaphis.*

Macrosiphum valerianae (Clarke)

Nectarophora valerianae Clarke, 1903:253.

Macrosiphum valerianae Soliman, 1927:137 (fate of types); Gillette and Palmer, 1928: 18 and 1934:199.

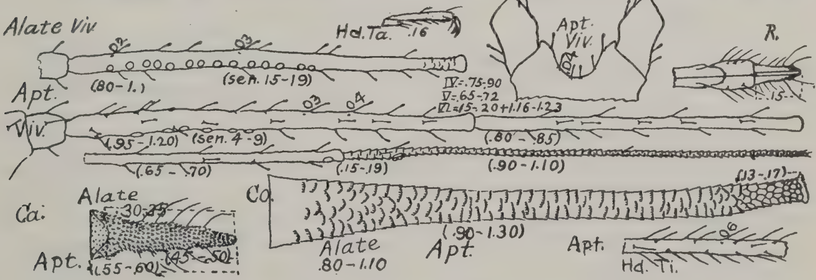

Fig. 395. *Macrosiphum valerianae*

Apterous Summer Vivipara. Dark brown; cauda and anal plate slightly dusky; tibiae dusky to blackish; antenna except base of III, and cornicle except base black; rostrum dusky to blackish distally. Body length 2.1-3.6-4; across eyes .50-.53; hind tibia 2.2-2.9; antenna 3.6-4.8; rostrum attaining 3d coxa. Hairs slightly capitate; on side of abdomen .03. Cornicle very slightly enlarged just proximad to reticulated area, imbrications appearing slightly denticulate. Cauda tapering, bearing 4-6 lateral pairs of hairs and a single dorsal preapical one.

Alate Vivipara. Same as apterous vivipara except as follows: rostrum attaining between 2d and 3d coxae; hairs on hind tibia .04, not exceeding length of diameter of tibia and other differences as shown in figures.

Collections. On leaves and stems of *Valeriana edulis, Rudbeckia* sp. and *Epilobium angustifolia.* Colorado: Log Cabin, Laramie River, Pingree Park, Cameron Pass, Grand Mesa. Utah: Mount Timpanogos and Monticello. Apterous summer viviparae July 26 to Aug. 24, alate viviparae Aug. 4 to Nov. 16; rather common and in large colonies, but host seldom observed.

Type. Lost.

Chief Distinguishing Characters. Dark brown body and blackish to black appendages and cornicle and dusky cauda and anal plate, number of sensoria on III (not more than 10 in apterous, or 20 in alate vivipara), long cornicle (ranging somewhat longer than III and exceeding 4-5 times length of hind tarsal II), short rostral IV+V, slight enlargement of cornicle just before reticulated area and the rather short extent of the reticulation, (about one-ninth of length of cornicle) and length of cauda (on median line 2-3 times length of hind tarsal II).

Macrosiphum wasintae (Hottes)

Adactynus wasintae Hottes, 1933:19.
Macrosiphum wasintae, Gillette and Palmer, 1934:200; Hottes, 1948a:31.

Apterous Summer Vivipara. Pale dull green; antenna pale to tip of III, dusky beyond; cornicle dusky beyond proximal third; cauda greenish; tibiae light brown. Body length 1.37-1.7; across eyes .46-.48; hind tibia 2-3; antenna 3-3.6; rostrum attaining 3d coxa. Hairs blunt; on side of abdomen .02 and sparse. Cornicle slender, imbricated, without reticulation but with one stria next to flange. Cauda parallel-sided to tapering, bearing about 3 lateral and 1-2 dorsolateral hairs on each side and a single dorsal preapical one.

Ovipara. Apterous. About the same as apterous vivipara except as follows: Body length 1.7-2; antenna about 3; cornicle .50-.55; hind tibia with proximal fourth very slightly swollen and bearing scattered sensoria.

Male. Alate. Body length 1.50; across eyes .45; antenna 2.60; cornicle .40; hind tibia 1.60-2.00; cauda .10 on median line, .15 on side.

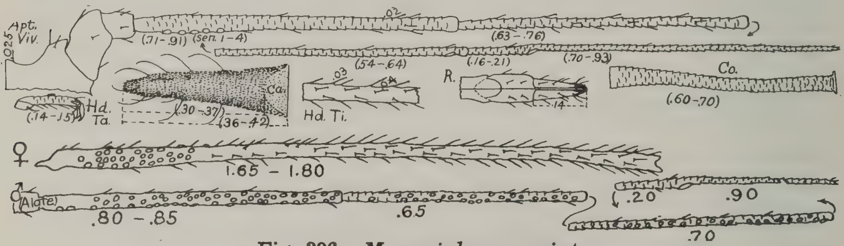

Fig. 396. *Macrosiphum wasintae*

Collections. On leaves of *Potentilla fruiticosa.* Colorado: Grand Mesa. Apterous summer viviparae Aug. 4; rare and difficult to find on account of solitary habit on underside of leaves.

Holotype. U.S.N.M. Paratypes, Hottes and Colo. Agr. Exp. Sta. Collections.

Chief Distinguishing Characters. Pale green body with pale cornicle, cauda and anal plate, absence of reticulation on cornicle, length of cornicle (hardly as long as IV and shorter than 5 times hind tarsal II), number of sensoria on III of aptera and rather short cauda (shorter than 3 times hind tarsal II or rostral IV+V).

Macrosiphum yagasogae Hottes

Macrosiphum yagasogae Hottes, 1948b:34 and 1949b:55 (description of male).

Apterous Summer Vivipara. Pale brownish yellow; with cornicle, cauda and appendages pale except tips of tibiae and of rostrum and entire antennal VI and tarsi which are dusky.

Body length 2.5-3.1; across eyes .55-.61; antenna 3.20-3.70; hind tibia 2.25-2.30; rostrum surpassing 2d coxa. Cornicle slightly expanded at base, slightly narrowed near distal end and enlarged just before flange, reticulated distinctly distally, faintly proximally. Cauda blunt, tapering, bearing 4 pairs of lateral hairs. Hairs slightly capitate; .04 on hind tibia, .03 on side of abdomen.

Alate Vivipara. Head and thorax dusky brown; abdomen "greenish yellow" with dusky lateral areas and dorsolateral spots on segments II to V and narrow crossband on I; tibiae and rostrum pale except tips; antenna and cornicle pale proximally dusky distally; cauda and anal plate pale. Body length about 3; across eyes .54; antenna about 4; hind tibia 2.5; rostrum attaining between 1st and 2d coxae. Hairs pointed to slightly blunt; on hind tibia .03 long. Otherwise as in apterous vivipara.

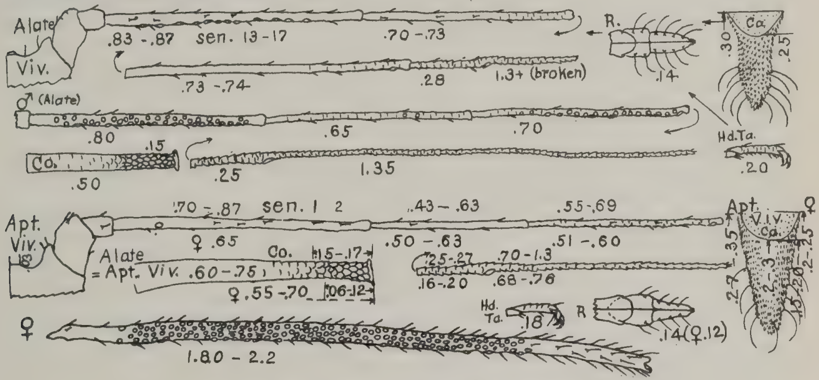

Fig. 397. *Macrosiphum yagasogae*

Male. Alate. Head and thorax dusky brown to blackish; abdomen "dark green" with dusky lateral areas and irregular dorsal patches and mostly dusky posterior to cornicles; rostrum, cauda, anal plate, cornicle and antenna beyond base of III dark; tibiae except tips pale. Body length 1.52-1.78; across eyes .50; antenna about 4; hind tibia 1.82; hind tarsal II .16; cauda .12 on median line, .16 on side. Otherwise as in alate vivipara.

Ovipara. Apterous. Same as apterous summer vivipara except as follows: Body length 2.20-3; across eyes .53; antenna 3.15-3.45; hind tibia with almost entire length very slightly swollen and thickly covered with small sensoria.

Collections. On leaves of Solomon's seal *(Smilacina* sp.*)*. Colorado: Mesa. Apterous viviparae July 22, alate viviparae July 15, males Sept. 10, apterous oviparae Sept. 23; rare.

Type. U.S.N.M. Paratypes, Hottes Collection.

Chief Distinguishing Characters. Pale brownish yellow body and pale appendages, length of V (exceeding IV), short cauda (hardly longer on median line, often shorter, than base of VI), length of base of VI (about twice length of rostral IV+V) and length of rostral IV+V (.12-.15, shorter than hind tarsal II).

The species differs from *M. glabrum* apparently only in color, slightly longer appendages and host plant.

Macrosiphum zerogutierreziae Smith and Knowlton

Macrosiphum zerogutierrezis Smith and Knowlton, 1937b:272.

Apterous Summer Vivipara. "Bright apple-green." (Mounted on slide), pale with cornicle beyond proximal third and antenna beyond base of III black; tibiae dark dusky; cauda light dusky. Body length 1.20-1.80; across eyes .36-.41; antenna 1.50-1.75-"2.20"; hind tibia 1-1.20; rostrum attaining 3d coxa. Cauda slender, tapering, bearing 2 pairs of lateral hairs and one preapical hair.

Alate Vivipara. Same as aptera except darker. Body length 1.50-2-"3"; across eyes .43; antenna "2.05"-2.25-"2.35"; rostrum attaining 2d coxa.

Collections. On *Gutierrezia* sp. Throughout region. Alate viviparae April 25 and June 26, apterous viviparae April 25 to Oct. 11.

Type. U.S.N.M. Paratypes, Colo. Agr. Exp. Sta. and Knowlton Collections.

This species differs from allied species in the presence of sensoria on IV in alate and occasionally in apterous vivipara and few hairs (2 lateral pairs) on cauda.

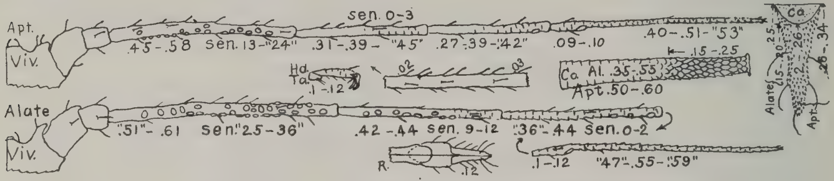

Fig. 398. *Macrosiphum zerogutierreziae*

Macrosiphum zerohypsi (Knowton and Allen) n. comb.

Mucrotrichaphis zerohypsi **Knowlton and Allen, 1940:34.**

Apterous Summer Vivipara. **(Cleared and mounted), head brownish; abdomen colorless with dark areas at bases of lateral and dorsolateral hairs, dorsal ones more or less faint; antenna beyond proximal portion of III, knees, tarsi and distal half of tibiae black; cornicle, cauda, anal plate and rostrum dusky. Body length 1.7-2; across eyes .38-.46; antenna about 2, III .55-.63, IV .38-.42, V .36-.40, VI .14-.17+.40-.47, sensoria 1-5 on III; hind tibia 1.10-1.20; hind tarsal II ".12"-.14-.16; cornicle .43-.50, reticulated area .03-.05; cauda on median line .26, on side .32; rostrum needlelike in ventral aspect, IV+V .14-.16, attaining 3d coxa. Hairs pointed; on vertex .04; on III .04, slightly exceeding diameter of segment; on abdomen .05, not very numerous; 3-4 on cornicle, .05-.06 long.**

Collections. On *Artemisia tridentata.* Utah: Dry Canyon (one mile south). Apterous summer viviparae April 8; rare.

Type and *Paratypes.* Knowlton Collection.

Chief Distinguising Characters. Short area of reticulation on cornicle (not over .05-.07), hairs on abdomen not numerous and short unguis (shorter than .50) and shallow frontal tubercles.

Not figured on account of close resemblance to *zerothermum* and *flavilum* which are figured.

Macrosiphum zerothermum Knowlton and Allen

Macrosiphum zerothermus **Knowlton and Allen, 1938c:83 and 1940:33.**
Mucrotrichaphis toti **Knowlton and Allen, 1940:33 (new synonymy).**

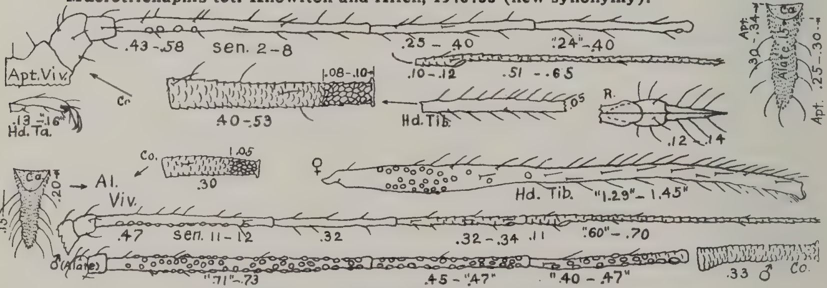

Fig. 399. *Macrosiphum zerothermum*

Apterous Summer Vivipara. **(Cleared and mounted), head dark; abdomen colorless with dark areas at dorsal and lateral hair bases; antenna, except proximal half of III, tibiae on distal half, cornicle, cauda, anal plate, and rostrum dark. Body length 1.5-2; across eyes .38-.45; antenna 2.1-2.6; hind tibia 1.08-1.30; rostrum attaining 3d coxa. Hairs on body numerous.**

Apterous Sexupara (?). Body length 1.5; across eyes .38-.43; antenna 2.1; hind tibia .82-1.08; cornicle .40-.55.

Alate Vivipara. Same as aptera except entire antenna and thorax dark. Body length 1.6; across eyes .38; antenna 2.15; hind tibia .92; rostrum attaining 3d coxa. Cauda rather slender, somewhat spatulate, bearing 4 pairs of lateral hairs and one preapical one.

Ovipara. Apterous. About the same as apterous vivipara except 7-8 sensoria on III and hind tibia swollen and bearing sensoria.

Male. Alate. Same as alate vivipara. Body length 1.64; antenna 2.3, sensoria numerous on III, IV and V; hind tibia 1.25.

Collections. On *Artemisia tridentata* and "short sage." Utah: Cedar Creek, Cedar Breaks, Kelton, Monte Cristo, Woodruff, Logan Canyon and Spring Hollow. Apterous viviparae July 18 to 26, apterous sexuparae (?) Aug. 8 to 25, alate viviparae Aug. 25, sexuales Oct. 24; rather common.

Type. M. toti and paratypes of *toti* and *zerothermum,* Knowlton Collection.

Chief Distinguishing Characters. Rather weak frontal tubercles, pointed to blunt hairs, length of unguis (longer than the cornicle and coequal with III, varying from shorter to considerably longer), length of the cornicle (.40-.53 in aptera, .30 in alata).

Macrosiphum zerozalphum Knowlton

Macrosiphum zerozalphum **Knowlton, (Sept.) 1935d:194 and 1936:213.**

Apterous Summer Vivipara. "Yellow-green." (Mounted on slide), antennal VI and base of V, tarsi and tips of tibiae dusky; cauda pale to dusky; cornicle pale with dusky tip. Body surface rugulose. Body length 2.2-"2.85"; across eyes .48-.50; antenna 2.5-2.8; hind tibia 1.5-"1.8"; rostrum attaining 2d coxa. Cauda nearly parallel-sided, bearing 3-4 pairs of lateral hairs and a single preapical one.

Alate Vivipara. "Yellow-green." (Mounted on slide), antenna beyond base of III, tarsi and tips of tibiae blackish; cauda and tip of cornicle slightly dusky. Body length 2-"2.31"; across eyes .43-.47; antenna 2.60-2.77; hind tibia 1.55-1.75. Hairs on body .01 and very sparse; without dark area at bases.

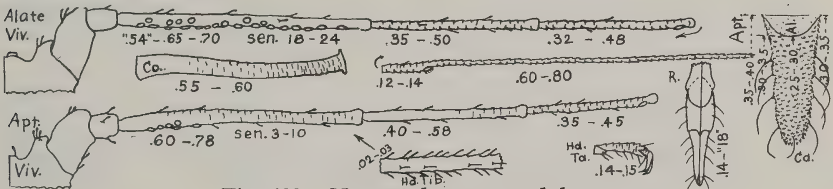

Fig. 400. *Macrosiphum zerozalphum*

Collections. On *Erodium cicutarium.* Utah: Uintah Mountains, Bountiful, Brighton, Deweyville, Leeds, Mamott, Penrose and Ogden. Apterous vivipara April 25 to June 25, alate viviparae April 25 to May 2; apparently rare.

Type: Knowlton collection or U.S.N.M.

Chief Distinguishing Characters. Lack of reticulation on cornicle, length of unguis (from .80-1.16 times the length of III), short to medium cauda of aptera (.30-.35) with 3-4 pairs of lateral hairs, immaculate green body, length of rostral IV+V (about the same as hind tarsal II) and number of hairs on rostral IV+V (not numerous), hairs on cauda (not more than 4 on each side) and their absence on cornicle.

This form is distinguished from *M. pelargonii* only by ratio of unguis to III.

Determination of status of this species was aided by specimens of *M. pelargonii* determined by Hille Ris Lambers.

Macrosiphum zionensis Knowlton

Macrosiphum zionensis **Knowlton, 1935a:115.**

Apterous Summer Vivipara. **(Mounted on slide), colorless with antenna dusky; cornicle, tarsi and tips of tibiae black; cauda and most of tibiae pale. Body length 3.90-"4.06"; across eyes .65; antenna over 5.20; hind tibia 3.60-"3.70"; rostrum attaining 2d coxa. Hairs blunt to slightly capitate on antenna; on body slender and pointed; on tibiae spinelike.**

Alate Vivipara. **"Green." (Mounted on slide), pale; cornicle and tips of appendages black; extreme base of antennal III and cauda pale. Body length over 3; across eyes .62; antenna longer than 5.20 (tip broken); hind tibia 3.10-"3.40". Hairs on body and antenna pointed to slightly blunt, on tibiae spinelike. Otherwise as in aptera.**

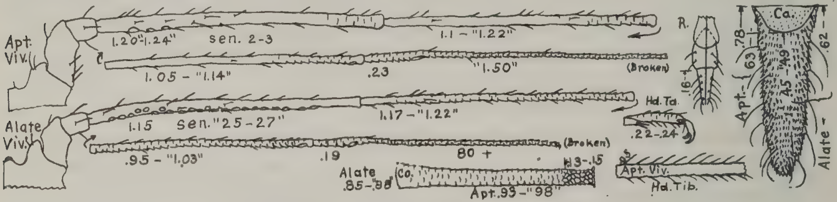

Fig. 401. *Macrosiphum zionensis*

Collections. On *Lupinus* sp. Utah: Panguitch. Apterous and alate viviparae July 14; rare.

Type. Knowlton Collection.

Chief Distinguishing Characters. Number of sensoria on III (in alate vivipara more than 20, in aptera fewer than 7); and length of IV (almost as long as III).

Macrosiphum zymozionensis Knowlton

Macrosiphum zymozionensis **Knowlton, 1946a:1.**

Apterous Summer Vivipara. **(Mounted in balsam), body pale without dusky spots at bases of hairs; with all appendages more or less dusky, cornicle lighter proximally. Dorsal integument somewhat rugulose. Body length "1.67"-2.15-"2.31"; across eyes .43-.45; antenna 1.75-"1.88"; hind tibia "1.07"-1.25-1.4-"1.88"; rostrum attaining 2d coxa. Cauda tapering, narrow, often asymmetrical, bearing 3-5 lateral pairs and 2-3 single dorsal hairs. Cornicle cylindrical and heavy. Hair slightly capitate, especially on body and antenna.**

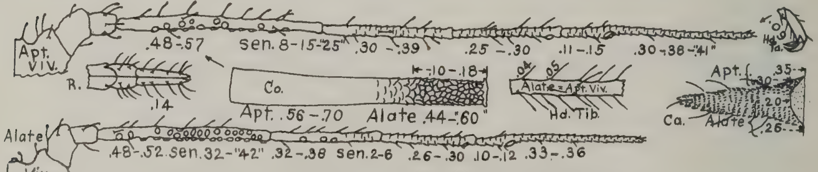

Fig. 402. *Macrosiphum zymozionensis*

Alate Summer Vivipara. **Body length "1.05"-2.1; across eyes .44; antenna 1.75-"1.79"; hind tibia 1.25-"1.37"; rostrum attaining 2d coxa. Otherwise same as apterous vivipara except as figured.**

Ovipara.* **Apterous. Same as apterous vivipara except hind tarsal II .12-.13 and hind tibia proximal half of which is somewhat swollen and bearing numerous sensoria.**

Male. **A single specimen, too mutilated to describe.**

Collections. On *Aster leucanthemifolius.* Utah: Zion Canyon National Park. Colorado: Fort Collins. Apterous and alate summer viviparae July 10, sexuales Nov. 10; very rare.

Type. Knowlton Collection.

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*These oviparae were not taken in same colonies or even in same locality as the viviparae so there is no proof of their belonging to the same species, but this tarsal difference seems insufficient basis for a separate species.

Chief Distinguishing Characters. Shortness of antennal segments (unguis two-thirds of III, III little longer han distance across eyes), length of cornicle (coequal with III), length of tibial hairs (equal to or exceeding the diameter of the tibia, .03-.035 in alate, .04-.05 in apterous vivipara), length of rostral IV+V (.13-.15) and length of the reticulated area of cornicle, about fourth of cornicle length).

Genus **Myzus** Passerini

Passerini, 1860:27; Baker, 1920a:57; Mason, 1940:3.

Characters. Frontal tubercles prominent and converging or gibbous, especially in aptera. Antenna six-segmented, I gibbous; secondary sensoria subcircular. Hairs blunt to slightly capitate, inconspicuous on appendages, much shorter than diameter of segments bearing them. Cornicle rather long and subcylindrical to slightly clavate. Cauda short and tapering, rarely parallel-sided. Rostral V indistinct. Lateral tubercles lacking. Ocular tubercle present. Fore wing with media twice-forked; hind wing with both media and cubitus. Genotype (fixed by Passerini 1860), *Aphis cerasi* Fabricius.

Key to Species of Myzus

1.	Cornicle with transverse striae or weak reticulation at tip	2
....	Cornicle without striae or reticulation	4
2.	Unguis not longer than III; sensoria present on IV in alate vivipara (p. 342)	*porosus*
....	Unguis longer than III; sensoria absent on IV in alate vivipara	3
3.	Cornicle with 1-2 transverse striae or transverse reticulations; apterous vivipara with sensoria present on III (p. 342)	*solani*
....	Cornicle with faint hexagonal reticulations; apterous vivipara without sensoria on III (p. 344)	*wakibae*
4.	Hind tarsal II longer than rostral IV+V	5
....	Hind tarsal II not longer than rostral IV+V	6
5.	Sensoria 6-11 on III in alate vivipara; absent in aptera; III not longer than .40; rostral IV+V not broad (p. 338)	*leucocrini*
....	Sensoria 5-12 on III of alate vivipara, 2-3 in aptera; III longer than .40; rostral IV+V broad. (p. 343)	*timpanogos*
....	Sensoria 10-15 on III in alate vivipara; absent in aptera; III longer than .40; rostral IV+V not broad (p. 340)	*persicae*
6.	Cornicle swollen (p. 339)	*monardae*
....	Cornicle not swollen	7
7.	Unguis much longer than III; cornicle not longer than IV (p. 336)	*circumflexus*
....	Unguis as above; cornicle longer than IV (p. 344)	*wakibae*
....	Unguis not longer than III	8
8.	Sensoria on III in alata not more than 10; body brown (p. 337)	*langei*
....	Sensoria on III in alata more than 10; body not brown	9
9.	Body light green to rusty; alata with black dorsal patch (p. 338)	*lythri*
....	Body black (p. 335)	*cerasi*

Genotype *Myzus cerasi* (Fabricius)

The Black Cherry Aphid (Plate VII)

Aphis cerasi Fabricius, 1775:734.
Myzus cerasi, Gillette and Taylor, 1908a:42; Gillette, 1908d:362; Wimshurst, 1925:85; Theobald, 1926:292; Gillette and Palmer, 1934:201; Eichmann, 1936: (life history); Mason, 1940:6.

Fundatrix. Similar to summer vivipara except as follows: Antenna .75-1.15, III and IV often coalesced as shown in figure; when not coalesced, segments similar to summer aptera but somewhat shorter; hind tibia .60-.70.

Apterous Summer Vivipara. Young, 1st Instar. Amber to brown. *Adult.* Black; shining; cauda dusky to black; antenna black on I, II, V and VI; cornicle and tarsi black; tibiae yellow except tips; rostrum yellowish to dusky. Body length 1.8-2; across eyes .43; hind tibia .95-1.05; antenna 1.25-1.6; rostrum attaining 2d coxa. Cornicle somewhat broader at base and constricted just before definite flange, strongly imbricated, curved outward, when at rest held against body so that tips converge and nearly touch. Cauda rather broad at base and strongly tapering, bearing 2-3 lateral pairs of hairs. Integument of head, antennal I and II and abdomen posterior to cornicles closely granulate or denticulate. Hairs minute, about .01 long and sparse on body, and appendages.

Alate Vivipara. Color same as in apterous vivipara. (Cleared and mounted), head and thorax dark; abdomen with dark lateral areas and sometimes dorsal patch evident; antenna and cornicle black, cauda and anal and genital plates dusky. Body length 1.4-1.6; across eyes .37-.39; hind tibia .93-1; antenna 1.7. Rostrum attaining 2d coxa. Hairs capitate, very sparse and inconspicuous; on vertex, antenna, hind tibia and on side of abdomen .01. Cornicle cylindrical, less tapering and curved than that of apterous vivipara. Cauda tapering to nearly cylindrical and bearing 2-3 pairs of lateral hairs. Otherwise as in apterous vivipara.

Ovipara. Apterous. Body length 1.10; across eyes .35; antenna .80-.85; hind tibia with proximal half slightly swollen and bearing about 20 sensoria.

Male. Alate. Deep black; abdomen may be dusky brown with dorsal bands and becoming black between and posterior to cornicles; antenna and cornicle black; cauda and rostrum dusky; tibiae yellow. Body length 1.30; antenna 1.70, sensoria tuberculate; hind tibia 1.1.

Collections. On leaves and twigs of sweet cherry *(Prunus avium)* and sour cherry *(P. cerasus)* and rarely plum, curling leaves (no alternate host plant proven for this region)*. Throughout region. Fundatrices April 14 to 27, apterous summer viviparae May 10 to Nov. 2, alate viviparae June 8 to Nov. 2, sexuales Nov. 2 to 17; common, in large colonies, often injurious.

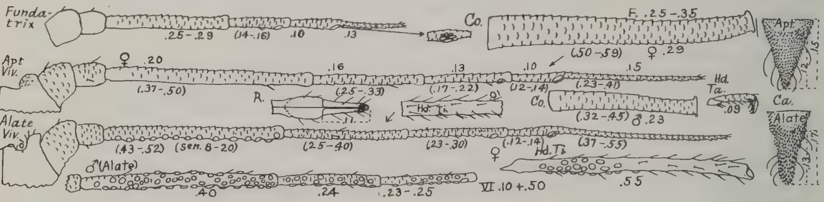

Fig. 403. *Myzus cerasi*

Chief Distinguishing Characters. Shiny black body and appendages except tibiae which are yellow, absence of sensoria on IV of alate vivipara, short hind tarsus (.09, shorter than base of VI) and hind tibia of ovipara only the proximal half of which is swollen, and that slightly, and bearing scattered large sensoria.

The form here described may not be the same species which W. A. Ross (1917:434) found migrating to *Lepidium* sp. as summer host. At least alate specimens, about ten, from sweet cherry loaned by Ross showed sensoria on IV which character has not been found in specimens here, nor has it been found in numerous alate viviparae sent by Robt. D. Eichmann. Eichmann (op. cit.) failed to find the species migrating to *Lepidium;* nor did he locate it on any summer host though the aphids disappeared from the cherry. These observations suggest a possible taxonomic difference. In Colorado the sweet cherry has not been seriously attacked; though the species does infest both sweet and sour cherry and experimental transwers from sour to sweet cherry have succeeded well.

Myzus circumflexus (Buckton)

The Crescent-marked Lily Aphid

Siphonophora circumflexa Buckton, 1876:130.
Myzus vincae Gillette, 1908b:19.
Macrosiphum circumflexum, Theobald, 1913b:116.
Myzus circumflexus, Theobald, 1926:331; Gillette and Palmer, 1934:202.

Apterous Summer Vivipara. Yellow-green with blackish U-shaped dorsal patch on abdominal II to V and a pair of dorsolateral patches on thoracic segments; all appendages pale to brownish; antennal VI and tips of III, IV and V and tip of cornicle blackish. Body length 1.5-1.7; across eyes .39-.43; hind tibia 1.1-1.75; antenna 2.4-2.5; rostrum attaining nearly to 3d coxa. Hairs capitate; on vertex, III, hind tibia and marginal row on abdomen .01. Cornicle cylindrical, slender. Cauda tapering to nearly cylindrical and bearing 2-3 hairs on each side.

*Record by Gillette (1918d:241) proved to be only accidental. The aphids have been found on cherry throughout the summer though in suddenly reduced numbers after early July, and an increase in alate forms has been recorded at the end of August and especially by the middle of September.

Alate Vivipara. Head and thorax black; abdomen yellow-green, usually with dorsal and ventral bands and lateral areas, especially anterior to cornicles, bands often coalesced to form dark dorsal patch on abdominal III, IV and V; antenna black; cornicle, cauda, anal and genital plates and tip of rostrum dusky; legs brownish with tarsi and tips of tibiae black. Otherwise same as apterous vivipara except as figured.

Collections. On leaves and stems of columbine *(Aquilegia* sp.*)*, *Asparagus* sp., *Aster* sp., celery *(Apium graveolens)*, easter lily, calla lily, cyclamen, oxalis, potato *(Solanum tuberosum)*, dock *(Rumex* sp.*)*, *Vinca* sp., *Viola* sp. and water hyacinth *(Piaropus crassipes)*. Colorado: (in greenhouses), Fort Collins and Boulder. Idaho: Twin Falls. Utah: Logan. Apterous summer viviparae Sept. 14 to April 30, alate viviparae (rather rare) Oct. 25 to May 6; very common.

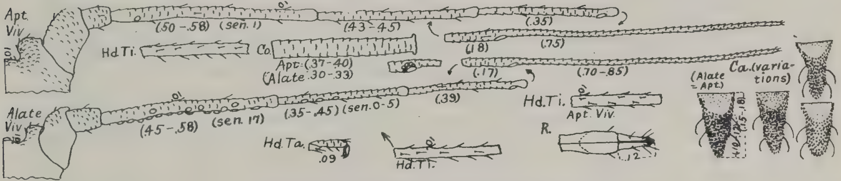

Fig. 404. *Myzus circumflexus*

Type. British Museum.

Chief Distinguishing Characters. Color pattern of both apterous and alate viviparae (dorsal patch on alate vivipara and U-shaped marking on apterous vivipara on green body), short cauda (on median line, about same length as rostral IV+V), usual presence of sensoria on IV in alate vivipara and short hind tarsal II (shorter than rostral IV+V).

Myzus langei Essig

The Water-cress Aphid

Myzus langei **Essig, 1936:70; Mason, 1940:11.**

Apterous Vivipara. Dark brown; dorsum rugose; appendages brownish with tarsi and tips of segments blackish; cauda and cornicle blackish. Body length 1.2-1.3; across eyes .33; antenna .95; hind tibia .50-.55; rostrum attaining 2d coxa. Frontal tubercles strongly developed and converging. Cornicle cylindrical to very slightly broader in distal half, straight to somewhat recurved. Cauda tapering and bearing 2 pairs of lateral hairs.

Alate Vivipara. Head and thorax black; abdomen dark brown; appendages pale yellowish to dusky with tips of segments blackish; cauda, anal plate and cornicle blackish. Body length 1.25-1.50; across eyes .35; antenna 1.40-1.50; hind tibia .80-.85; rostrum attaining 2d coxa. Cauda and cornicle as in apterous vivipara.

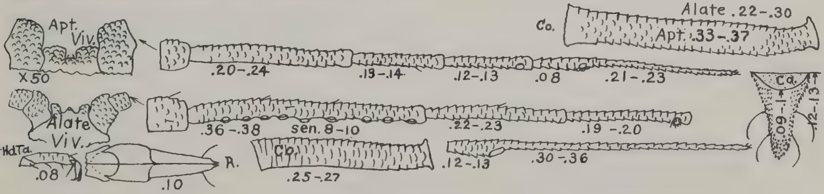

Fig. 405. *Myzus langei*

Collections. On leaves of *Roripa aquatica.* Colorado: Fort Collins. Alate and apterous viviparae Aug. 20 and Sept. 23; rare.

Cotypes. Essig Collection.

Chief Distinguishing Characters. Dark brown body, cylindrical, recurved cornicle, number of lateral hairs on cauda (not more than 2 pairs), shortness of antenna in aptera (shorter than body) and wing veins not clouded.

The Colorado examples are somewhat smaller in all measurements than those given in Essig's description but specimens examined by Essig were determined by him as his species.

Myzus leucocrini Gillette and Palmer

The Sand Lily Aphid

Myzus leucocrini Gillette and Palmer, 1929b:470 and 1934:202.

Apterous Summer Vivipara. Light green in nymph or young adult, brownish green to nearly black in old adults; with conspicuous rusty blotch at each cornicle base; dorsal surface reticulated; cauda pale; cornicle dusky especially at tip; antenna dusky on tips of III and IV and entire V and VI; tibiae pale with black tips; tarsi black; a pair of structures resembling ocelli or tubercles on head located dorsolaterally between base of antenna and eye and two more pairs on abdominal V and VI just mesad of cornicle bases. These structures appear white in life and as clear circles in cleared and mounted specimens. They are not easily apparent in all examples. Body length 1.6-1.75; across eyes .35; hind tibia .83-1; hind tarsal II .13; antenna 1.6; rostrum attaining 2d coxa. Hairs blunt; on side of abdomen .01 and sparse. Cornicle with outer margin curving so that tips converge, inner margin curving from broadened base to form more slender middle portion then forming slight swelling just before tip, imbricated and with distinct flange. Cauda blunt, nearly parallel-sided, with slight neck and bearing 5 pairs of lateral hairs. Antenna, including inner edges of I and II and frontal tubercles, strongly imbricated. Vertex with slight tuberclelike prominence.

Alate Vivipara. Light green to dusky on head and pronotum; thorax black; abdomen green with dusky green dorsal dashes and lateral areas, orange areas about bases of cornicle; cauda pale to slightly dusky; anal and genital plates dusky; rostrum, cornicle and tibiae pale to dusky especially distally; antenna pale on base of III, otherwise dusky especially at tips of segments and entire VI; wings with veins slightly bordered. Measurements same as apterous vivipara except as figured. Tuberclelike structures located more posteriorly on head and not clearly evident on abdomen.

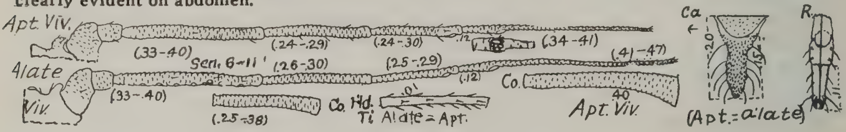

Fig. 406. *Myzus leucocrini*

Collections. On leaves of *Leucocrinum montanum.* Colorado: Fort Collins. Alate and apterous viviparae May 4 to 28; very abundant where occurring. The large number of alatae in May suggest migration to an alternate host.

Type. U.S.N.M., No. 41921. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Body color (pale green in alate and blackish brown to light green in apterous vivipara, also with orange blotch at each cornicle base) and veins of both fore and hind wings narrowly bordered, strongly imbricated inner edges of antennal I and II and frontal tubercles, peculiar shape of cornicle, numerous hairs (5 pairs) on cauda and small number of sensoria (6-11) on III of alate vivipara.

Myzus lythri (Schrank)

The Mahaleb Cherry Aphid

Aphis lythri Schrank, 1801:115.
Aphis mahaleb Koch, 1854:113.
Myzus mahaleb, Gillette and Palmer, 1934:203.
Myzus lythri, Mason, 1940:13.

Apterous Summer Vivipara. Apple-green to lettuce-green; appendages pale except tips of segments; cornicle dusky. On *Prunus.* Body length 1.6-1.7; across eyes .44; hind tibia .80-.90; hind tarsal II .10; antenna 1.1-1.2; rostrum surpassing 2d coxa. Hairs blunt, very inconspicuous; on side of abdomen not evident. Cornicle rather heavy, broader at base, heavily covered with somewhat denticulate imbrications; cauda tapering to a point, rather broad and short, bearing 3 pairs of lateral hairs. Dorsal body surface rugose. Frontal tubercles with rudimentary tuberclelike projection, seen only in certain position. On *Epilobium* sp. Body length 1-1.4; across eyes .33; antenna .75; hind tibia .53; hind tarsal II .07; rostrum attaining 3d coxa or abdomen.

Alate Vivipara. **Head and thorax brown; abdomen light green to rusty or light yellow with red on anterior portion of abdomen and on venter, especially in examples on *Epilobium* and with dusky dorsal patch and lateral areas; antenna, cauda and cornicle dusky; tibiae yellow with tips blackish. Body length 1.3-1.7; across eyes .40-.44; antenna 1.3-1.6; hind tibia .90-1.05; rostral IV+V .13, surpassing 2d coxa. Otherwise as in apterous vivipara except dorsal surface smooth but with pigmented lateral areas denticulate and cauda with slight neck.**

Ovipara. **Apterous. Yellowish to dark brown; all appendages dusky. Body length 1.5-1.8; across eyes .38; antenna .70, III .18-.20, IV .12, V .10, VI .09+.13-.15; hind tibia considerably swollen nearly to tip (on three-quarters of length) and bearing numerous sensoria.**

Male. **Alate. Color and measurements similar to alate vivipara but with dorsal bands not entirely coalesced into a patch and appendages usually darker.**

Collections. On leaves and stems of tender shoots of *Prunus mahaleb,* as winter host; on *Epilobium adenocaulon* as summer host. Colorado: Fort Collins. Utah: Santa Clara, Farmington, Levan, Hurricane, and Springvale. On *Prunus.* Apterous summer viviparae April 25 to June 25, alate viviparae May 29 to June 29 and Sept. 25 to Nov. 8, oviparae Oct. 9 to Nov. 1, males Sept. 30 to Nov. 3; common except during July and August. On leaves of *Epilobium adenocaulon,* apterous and alate summer viviparae June 15 to Nov. 23, alate males Sept. 30 and Oct. 6.

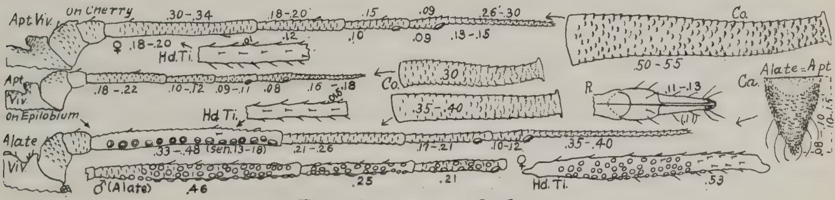

Fig. 407. *Myzus lythri*

Epilobium sp. and *Galium* sp. appear to be summer hosts but no transfer tests have been attempted. Spring alatae refused *Chenopodium album,* cabbage, chrysanthemum and shepherdspurse in cages. *Lythrum* has not been tried as a host here.

Mason's synonymy is confirmed by specimens determined as *M. lythri* (Schrank) by Hille Ris Lambers. These latter specimens seem to agree in all particulars with Colorado specimens from mahaleb cherry. *Myzus mahaleb* (Koch) has been placed as a synonym of *Phorodon humuli* (Schrank) by Theobald and others, but this cannot be correct because Koch distinctly mentions the lack of the fingerlike projection on antennal tubercles. The Rocky Mountain specimens agree with Koch's description.

Chief Distinguishing Characters. Brown dorsal patch in alata with yellow or green ground color, often stained with red in alata on *Epilobium* and the green body in apterous vivipara, shape of the frontal tubercles (shallow in some views but with a rudimentary tubercle projecting mesad especially in aptera) and the heavily imbricated surface of these structures, shape of the cornicle (heavy, cylindrical and somewhat recurved outward) short unguis (rather shorter than III) heavy denticulate imbrications on cornicle and structure of hind tibia of ovipara, three-quarters of which is swollen and bearing numerous sensoria.

Myzus monardae (Davis)

The Horsemint Aphid

Phorodon monardae **Williams, 1910:89 (nomen nudum).**
Rhopalosiphum monardae **Williams (nomen nudum), Davis, 1911b:36.**
Myzus monardae **Williams (nomen nudum), Gillette and Palmer, 1934:204.**
Myzus monardae **(Davis), Mason, 1940:14.**

Apterous Summer Vivipara. Yellow-brown; cauda pale; cornicle and tibiae brownish; antenna dusky beyond middle of III. Body length 1.25-1.43; across eyes .36; hind tibia .70-.75; hind tarsal II .07; antenna 1.3-1.8; rostrum surpassing 2d coxa. Cornicle somewhat stout, distinctly swollen on distal half, closely imbricated. Cauda tapering, bearing 2 pairs of lateral hairs. Hairs blunt, inconspicuous, as in alate vivipara.

Alate Vivipara. Head and thorax dark; abdomen yellow-brown; antenna dusky beyond base of III; cornicle and tibiae slightly dusky; cauda pale; wing veins slightly smoky. Body length 1.3-1.5; across eyes .35; hind tibia .80-1.03; hind tarsal II .07; antenna 1.7-1.9; rostrum surpassing 2d coxa. Hairs blunt, inconspicuous; on side of abdomen not evident.

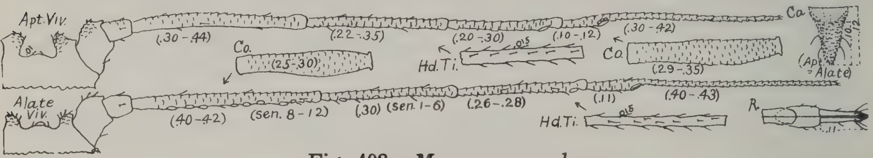

Fig. 408. *Myzus monardae*

Collections. On leaves of *Monarda menthaefolia.* Colorado: Boulder, Bellvue and Fort Collins. Apterous summer viviparae May 12 to Nov. 6, alate viviparae May 30 to June 2; not common.

Type. Univ. of Neb. Collection, No. 160. Paratypes, U.S.N.M.

Chief Distinguishing Characters. Yellow-brown body with absence of dark dorsal patch in alate vivipara, markedly swollen cornicle, rather short unguis (about same length as III), number of sensoria on III of alate vivipara, usual presence of sensoria on IV and absence of the same on V.

Myzus persicae (Sulzer)

The Green Peach Aphid (Plate VII)

Aphis persicae Sulzer, 1776:105.
Aphis dianthi Schrank, 1801:114.
Siphonophora achyrantes Monell, 1879:18.
Myzus malvae Oestlund, 1886:31.
Myzus persicae, Passerini, 1860:35; Gillette and Palmer, 1908a:32; Gillette, 1908d:359; Theobald, 1926:318; Mason, 1940:15 desc. and full synonymy.

Fundatrix. Young. Newly hatched, dull dark green with appendages sordid to dusky brown. Later, after feeding, lighter green tinged with yellowish. ***Adult.*** Pale green mottled with light salmon; appendages and cornicle pale, blackish at tips. Body length 1.7; antenna .80-1.14, III and IV usually coalesced; hind tibia .70-.85.

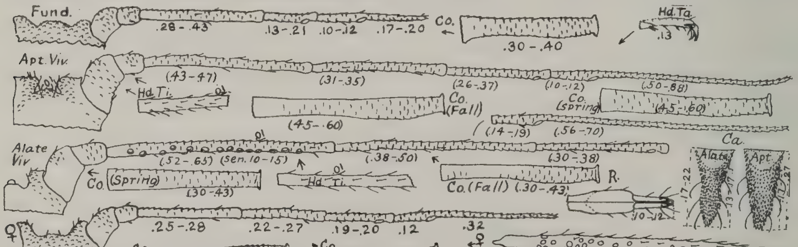

Fig. 409. *Myzus persicae*

Apterous Summer Vivipara. Pale yellow to green, in early summer usually with median and lateral longitudinal darker green stripes; dorsum finely rugose; all appendages pale with tarsi, tips of tibiae of antenna, of rostrum and of cornicle dusky. Body length 1.86-2; across eyes .42; antenna 1.7-2.4; hind tibia 1.08; rostrum attaining between 2d and 3d coxae. Cornicle cylindrical to slightly swollen. Cauda tapering, bearing 3 pairs of lateral hairs. Hairs blunt to slightly capitate, very short and inconspicuous.

Alate Vivipara. Spring Migrant. Head and thorax black; abdomen pale yellowish green with dark dorsal patch (sometimes broken into bands) and lateral areas; cauda pale to dusky; tibiae pale to sordid with tips and tarsi black; cornicle dusky; antenna dusky to black except base of III; veins not smoky. Body length 1.8-2.1; across eyes .43; hind tibia 1-1.55; antenna 2.2-2.7; rostrum hardly attaining 2d coxa. Cornicle cylindrical, not noticeably swollen. Hairs blunt; on side of abdomen .01. Cauda with slight constriction, bearing 3 pairs of lateral hairs. *Fall Migrant.* Yellowish and with cornicle slightly swollen.

Ovipara. Young. Newborn, green but soon changing to the adult color. *Adult.* Apterous. Bright flesh or salmon. Appendages as in apterous vivipara except that hind tibia may be dusky. Body length 1.50-2; across eyes .36; antenna 1.20-1.45; cauda .14 on median line, .18 on side; hind tibia with proximal half to two-thirds very slightly swollen and bearing scattered sensoria.

Male. Alate. Same as fall migrant except as follows: Dark abdominal markings often more extensive; cornicle dusky to black and as figured.

Egg. Newly laid, green to yellowish; later, shining black. Size .66 by .33.

Collections. As winter host: On leaves, curling them, of peach and nectarine mostly,* but also apricot (*Prunus armeniaca*), sand cherry (*P. besseyi*), cherry (*P. cerasus*), plum (*P. americana* and *P. domestica*), flowering almond (*P. japonica*) and choke cherry (*P. virginiana*); as summer host, on leaves of hollyhock (*Althaea rosea*) *Amaranthus* sp., snapdragon (*Antirrhinum* sp.), celery (*Apium graveolens*), horseradish (*Armoracia lapathifolia*), asparagus fern (*Asparagus* sp.), sugar beet (*Beta vulgaris*), rape (*Brassica napus*), cauliflower and cabbage (*B. oleracea*), turnip (*B. rapa*), pot marigold (*Calendula officinalis*), shepherdspurse (*Capsella bursa-pastoris*), thistle (*Cirsium* sp.), lambsquarters (*Chenopodium album*), chrysanthemum, *Cineraria* sp., watermelon (*Citrullus vulgaris*), wild morning glory (*Convolvulus* sp.), canteloupe (*Cucumis melo*), squash (*Cucurbita maxima*), carnation (*Dianthus* sp.), foxglove (*Digitalis purpurea*), fetid marigold (*Dyssodia* sp.), strawberry (*Fragaria* sp.), *Iresine lindeni*, wild lettuce (*Lactuca spicata*), *Lepidum* sp., easter lily (*Lilium candidum*), *Lupinus* sp., tomato *Lycopersicum esculentum*), apple (*Malus* sp.), *Malva neglectus*, tobacco (*Nicotiana tabacum*), bluegrass (*Poa* sp.), poppy (*Primula africana* and *P. forbesi*), *Quincula lobata*, radish (*Raphanus sativus*), calla lily (*Richardia* sp.), castor bean (*Ricinus communis*) watercress (*Roripa nasturtium-aquaticum*), dock (*Rumex* sp.), Russian thistle *Salsola* sp.), egg-plant (*Solanum melongena*), potato (*Solanum tuberosum*), *Sphaeralcea coccinea*, *Stellaris media*, *Tanacetum vulgare*, red clover (*Trifolium pratense*), white clover (*T. repens*), nasturtium (*Tropaeolum majus*), *Tulipa* sp., *Verbena* sp., *Vicia* sp., violet (*Viola* sp.), wheat and corn. Throughout region. Fundatrices on winter host March and April; apterous summer viviparae on winter host March 14 to May 22, on summer hosts May 15 to Nov. 2; alate viviparae (spring migrants) on winter host March 23 to June 15 and (fall migrants) Sept. 12 to Nov. 11, on summer hosts April 25 to Nov. 9; sexuales on winter host Oct. 7 to Nov. 12; very common and often injurious.

Chief Distinguishing Characters. Pale green body with darker green longitudinal stripes in early summer aptera and dark dorsal patch (sometimes broken into bands) in all alate forms, slightly swollen cornicle in summer and fall forms and its inconspicuous imbrications, number of sensoria (10-15) in alate vivipara on III and their absence on IV and only very slightly swollen hind tibia of ovipara rather sparsely covered with sensoria.

*Progeny of the stem mothers rarely develop well on hosts other than peach.

Myzus porosus Sanderson

Myzus porosus Sanderson, 1901a:205; Hottes and Frison, 1931a:340; Mason, 1940:18.
Macrosiphum zoorosarum Knowlton and Smith, 1936b:264; Knowlton, 1943b:124 (synonymy).

Apterous Summer Vivipara. (Mounted on slide), body immaculate; cauda and cornicle pale to slightly dusky; tibiae and antenna beyond base of III more or less dusky. Body length 1.75-2; across eyes .37-.39; antenna about 2; hind tibia 1.2-1.35-"1.45"; rostrum attaining between 1st and 2d coxae.

Alate Vivipara. (Mounted on slide), body immaculate; antenna beyond base of III, tips of tibiae and entire tarsi black; cauda and cornicle pale to dusky; tibiae and distal segments of rostrum dusky. Body length 1.4-2; across eyes .37-.40; antenna about 2; rostrum attaining between 1st and 2d coxae.

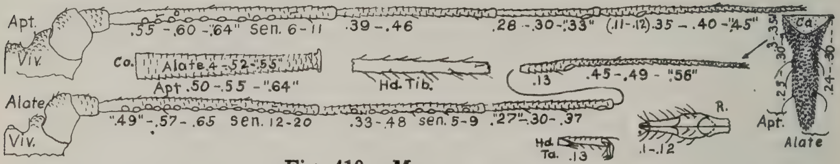

Fig. 410. *Myzus porosus*

Collections. On roses. Utah: Saint George. Alate and apterous viviparae April 26; rare.

Type. U.S.N.M., No. 5423; *M. zoorosarum* Knowlton and Smith, U.S.N.M. Paratypes of *zoorosarum,* Knowlton and C. F. Smith Collections.

Chief Distinguishing Characters. Absence of reticulation on cornicle, number of sensoria on antenna (in alate vivipara 13-20 on III and 6-9 on IV, in apterous vivipara 6-12 on III) and number of hairs on cauda (2 lateral pairs).

Myzus solani (Kaltenbach)

The Foxglove Aphid (Plate VIII)

Aphis solani Kaltenbach, 1843:15.
Macrosiphum solani, Theobald, 1913b:127.
Myzus pseudosolani Theobald, 1922:8; 1926:313; and 1929:338 (synonymy); Patch, 1928:49; Hille Ris Lambers, 1933:174; Gillette and Palmer, 1934:206; Essig, 1947:607.
Myzus convolvuli (Kaltenbach), (misidentification), Mason, 1940:8, desc. and full synonymy.

Apterous Summer Vivipara. Head yellow; rest of body grass- or apple-green, mottled with yellow on dorsum and darker green on sides and around cornicle bases; appendages pale with black tips on antennal segments, tibiae and cornicle. Body length 2-2.5; across eyes .47; hind tibia 1.5-1.75; hind tarsal II .10-.11; antenna 2.8-3; rostrum surpassing 2d coxa. Hairs slightly capitate; .01 on side of abdomen. Cornicle cylindrical, slender, with distinct flange, with two cross striations with cross connections, approaching transverse reticulation; cauda tapering, rather slender, bearing 3 pairs of lateral hairs.

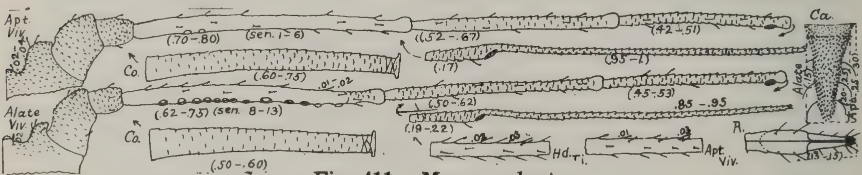

Fig. 411. *Myzus solani*

Alate Vivipara. Head and thorax pale yellowish brown; pronotum pale green; area surrounding base of each ocellus dark; abdomen yellowish apple-green with dusky green lateral areas and broken dorsal intersegmental dashes which contain glandular areas; antenna dusky except base of III; tibiae sordid with black tips; cauda pale; cornicle pale with black tip; wing venation slightly heavy. Measurements same as apterous summer vivipara except for differences figured.

Collections. On leaves of cineraria, gladiolus, potato, tomato, *Helichrysum* sp., lettuce, *Leonurus* sp., lily and red raspberry (*Rubus strigosus* and *R. laci-*

niata), in flower beds and greenhouses. Colorado: Fort Collins. Utah: Logan. Idaho: Twin Falls and Buhl. Alate and apterous viviparae all the year around in greenhouses, outdoors April 15 to Oct. 10; not very common.

Type. Location unknown. Type of *Myzus pseudosolani* Theobald in British Museum.

Chief Distinguishing Characters. Intersegmental broken dorsal dashes in alate vivipara, dark green area at base of each cornicle in apterous vivipara, rather large flange and indistinct transverse reticulation on cornicle. The frontal tubercles approach *Macrosiphum* but the hairs and cauda are like *Myzus.*

This species has been placed under *M. convolvuli* (Kaltenbach) by Mason (1940:8) but our specimens disagree with Kaltenbach's description as follows: III not "gekerbt," absence of dorsal patch in alate vivipara, cornicle not "thicker before tip." The description of *convolvuli* fits *M. persicae* (Sulzer) much better and is stated by Hille Ris Lambers (1946:197) to be that species.

Myzus timpanogos (Knowlton) n. comb.

Utamphorophora timpanogos **Knowlton, 1946b:1; Hottes, 1950b:38.**

Alate Vivipara. **(Cleared and mounted on slide), head and thorax dark; abdomen without markings; cornicle and appendages especially tibiae, dark; cauda slightly dusky. Body length 2.4; across eyes .43; hind tibia 1.2-1.5; antenna about 2.2-2.4; rostrum attaining between 1st and 2d coxae. Hairs minute and sparse on appendages and body. Antennal tubercles in nymph showing protuberance, suggestive of fingerlike tubercle of *Phorodon.***

Apterous Summer Vivipara. **Medium green; cornicle, rostrum and legs brown; cauda and anal plate slightly dusky; tarsi, antenna beyond III and tips of tibiae black. Body length 2; across eyes .40; antenna 2; hind tibia 1.1; rostrum attaining 2d coxa. Cornicle swollen, without reticulation. Cauda tapering to spatulate, bearing 2 pairs of lateral hairs and a single preapical one.**

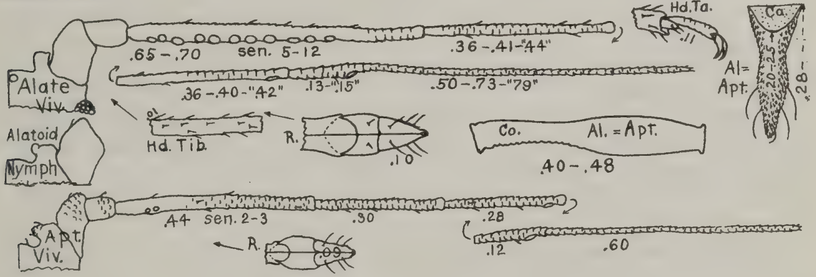

Fig. 412. *Myzus timpanogos*

Collections. On leaves or stems of *Monarda* and in sweeps from *Carex**. Utah: Aspen Grove, Mount Timpanogos. Colorado: Skyway. Alate summer viviparae and nymphs June 13; apterous viviparae June 13 and July 21; rare.

Type. Knowlton Collection.

This species strikingly resembles *M. monardae* and *Phorodon menthae* on account of the tendency to fingerlike projection on antennal tubercles especially in nymph. However, it differs in the cauda which is elongate (.20-.25 on median line instead of .10-.12) and spatulate instead of tapering.

*The host plant for this species seems to be uncertain. On "*Monarda* (?)" were taken alate viviparae and alatoid nymphs, showing unquestionable development on that plant; but was it *Monarda?* In sweeping *Carex* were taken apterae which obviously could hardly have been strays or migrants but they were not observed *on* the *Carex.* The broad rostral IV+V indicates a feeder on grass or sedge.

Myzus wakibae (Hottes)

Dactynotus wakibae Hottes, 1934:6.
Myzus wakibae, Palmer, 1936b:746.

Apterous Summer Vivipara. "Head and thorax light brown with greenish tinge; abdomen with dark brown patch on lighter brownish green background but dark brown again on lateral portion and part of venter; light area about base of each cornicle; antenna progressively darker beyond base of III; cornicle light brown; tibiae yellowish brown with dark tips." Body length 1.6-1.76; antenna 2.2; hind tibia 1.17; rostrum attaining 2d coxa. Cornicle slender, cylindrical, imbricated; cauda broad tapering to point, bearing 2 pairs of lateral hairs. Hairs blunt, inconspicuous.

Alate Vivipara. "Head and thorax brown; abdomen brown except greenish intersegmental band between segments I and II and greenish about cornicle bases; appendages brown." Body length 1.75-2; hind tibia 1.5; hind tarsal II .12; antenna 2.15; rostrum attaining between 1st and 2d coxae. Cornicle cylindrical, with very faint reticulations. Cauda parallel-sided, bearing 2 pairs of lateral hairs.

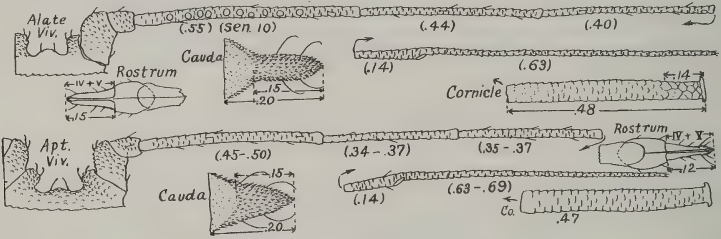

Fig. 413. *Myzus wakibae*

Collections. On leaves and stems of *Pedicularis canadensis*. Colorado: Skyway (on Grand Mesa). Alate and apterous viviparae Aug. 6; rare.

Type. U.S.N.M., No. 50361.

Chief Distinguishing Characters. Brown body with green area about each cornicle base, faint reticulation on cornicle of alate vivipara, length of rostral IV+V (.12-.15).

Genus **Phorodon** Passerini

Passerini, 1860:27.

Characters. Frontal tubercles each with a fingerlike projection which is especially prominent in aptera. Antennal I with medially projecting process. Other characters as in *Myzus*.

Genotype (fixed by Passerini, 1860), *Aphis humuli* Schrank.

Key to Species of Phorodon

1. IV longer than 3 times hind tarsal II. On *Mentha* (p. 345)..*menthae*
.... IV not longer than 3 times hind tarsal II. On *Humulus* (p. 344)................................*humuli*

Genotype *Phorodon humuli* (Schrank)

The Hop Aphid

Aphis humuli Schrank, 1801:110.
Phorodon humuli, Riley, 1888:70; Gillette, 1908a:40 and 1909c:354 and 1911c:382 and 1915a:102; Theobald, 1926:273; Gillette and Palmer, 1934:207.

Apterous Summer Vivipara. Yellow to pale green, darker on median lines and lateral areas; dorsum somewhat rugose; antenna, cauda, rostrum, cornicle and tibiae pale except tips of antenna and of tibiae dusky. Frontal tubercles each with a fingerlike process. Body length 1-2.3; across eyes .26-.30; hind tibia .42-.78; hind tarsal II .06-.08; antenna .93-1.09; rostrum attaining between 2d and 3d coxae. Hairs on body not noticeable. Cornicle cylindrical slightly recurved, imbricated. Cauda rather broad and tapering, bearing 3-4 hairs on each side.

Alate Vivipara. Head and thorax dark; abdomen pale yellowish green with dorsal bands, nearly coalescing on III, IV and V, and lateral areas dark; antenna except base of III, cornicle and tibiae dusky; cauda pale to dusky. Body length 1.5-1.8; across eyes .30-.35; hind tibia 1-1.3; antenna 1.66-1.85. Hairs on body not evident. Cornicle and cauda as in apterous vivipara.

Ovipara. Dull olive-green, tinged laterally with rusty red; all appendages dusky especially hind tibiae which are blackish. Body length 1.33; across eyes .30; antenna .93; hind tibia with proximal four-fifths moderately swollen and bearing numerous rather large sensoria.

Male. Alate. Head and thorax black; abdomen dark green with black dorsal bands and lateral areas; all appendages dusky to blackish. Body length 1.33; antenna 2; hind tibia 1.

Collections. On leaves of Plum *(Prunus* sp.*)* as winter host, on leaves of Hop *(Humulus lupulus)* as summer host. Throughout region. Apterous summer viviparae April 26 to July 18, or a few all summer on plum, on hop July 11 to Sept. 29; alate viviparae June 27 to July 11 on plum, on hop Aug. 21 to Sept. 19; oviparae on plum Oct. 28 to Nov. 25; males Oct. 16; rather common.

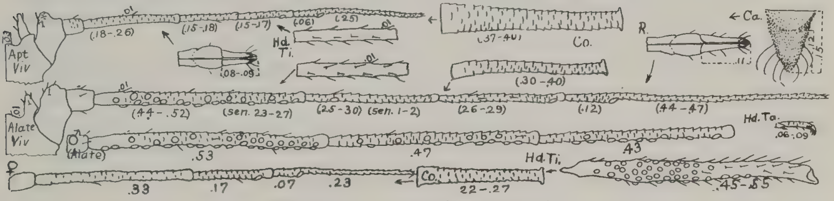

Fig. 414. *Phorodon humuli*

Chief Distinguishing Characters. Length of antennal IV (shorter than 4 times length of hind tarsal II and shorter than three-quarters of the length of III), length of rostral IV+V (not longer than .11, not longer than base of VI in alate vivipara) and length of unguis (usually not longer than III).

Phorodon menthae (Buckton)

Siphonophora menthae **Buckton, 1876:120.**
Phorodon menthae**, Theobald, 1926:278; Gillette and Palmer, 1934:208.**

Apterous Summer Vivipara. Yellow green to apple-green, mottled with darker green; cauda, cornicle and tibiae pale. Body length 1.5-1.9; across eyes .33-.43; hind tibia .70-.95; hind tarsal II .09; antenna 1.55-2; rostrum attaining between 2d and 3d coxae. Cornicle cylindrical, slender, faintly imbricated. Cauda tapering to slender point, bearing about 3 pairs of lateral hairs.

Alate Vivipara. Head and thorax dark brown; abdomen yellow-green to green-yellow, mottled; appendages pale except antenna dusky; veins of fore wing more or less heavy. Body length 1.5-1.66; across eyes .36; hind tibia .95-1.08; hind tarsal II .09; antenna 1.94-2.34; rostrum attaining between 2d and 3d coxae. Hairs blunt; on side of abdomen .01-.02. Cornicle and cauda as in aptera.

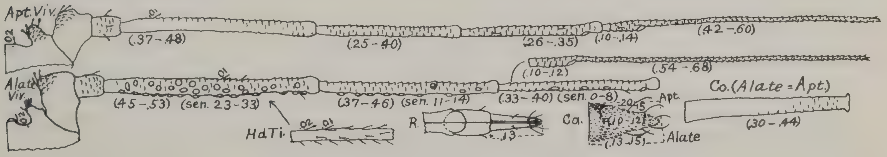

Fig. 415. *Phorodon menthae*

Collections. On leaves of *Mentha* sp. Colorado: Boulder and Fort Collins. Apterous summer viviparae all months of the year; alate viviparae all months except April, May and July; fairly common.

Cotypes. British Museum.

Chief Distinguishing Characters. Length of IV (4 or more times length of hind tarsus in alata and three-quarters as long as III), length of rostral IV+V (.13, as long to longer than base of antennal VI) and length of unguis (usually longer than III).

Subfamily **Mindarinae** Baker

Baker, 1920a:61.
Characters. As in genus *Mindarus.*

Genus **Mindarus** Koch

Koch, 1856:277; Baker, 1920a:62; Theobald, 1929:318.

Characters. Vertex slightly convex; frontal tubercles lacking. Antenna six-segmented; antenna with unguis much shorter than base of VI, secondary sensoria oval and transverse. Cornicle a mere ring. Cauda inconspicuous, short but somewhat elongate, not semilunar. Hairs simple and inconspicuous. Fore wing with media once-branched; radial sector arising at proximal portion of stigma; stigma long and tapering, reaching to tip of wing; hind wing with both media and cubitus. Rostrum obtuse, segment V indistinct. Sexuales small and apterous but with beaks and feeding; ovipara without sensoria on hind tibia; laying 8 or 9 eggs apiece. Living free on twigs of conifers, causing more or less distortion.

Genotype (monotypical), *Mindarus abietinus* Koch.

Genotype *Mindarus abietinus* Koch

The Balsam Twig Aphid

Mindarus abietinus Koch, 1856:277; Theobald, 1929:318; Patch, 1910a:242; Gillette and Palmer, 1934:243.

Fundatrix. Pale yellow with dusky lateral areas; with woolly secretion posteriorly; appendages pale except tarsi which are dusky. Body length 2; hind tibia .47-.50; antenna .66.

Apterous Summer Vivipara. Body length 1.5; hind tibia .20-.24; hind tarsal II .10-.14; antenna .55, III .16-.18, IV .06-.09, V .08-.12, VI .10-.12+.02.

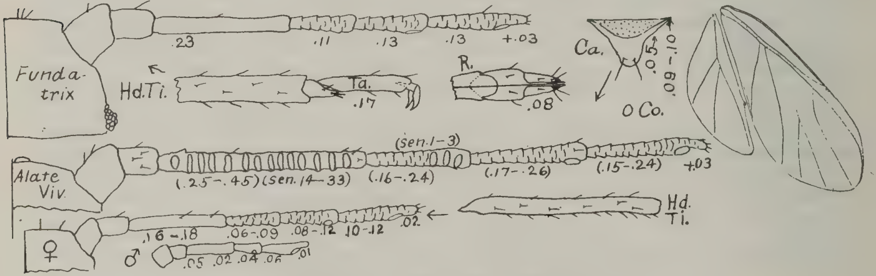

Fig. 416. *Mindarus abietinus*

Alate Vivipara. Brown on head and thorax, pale green on prothorax and abdomen the latter with dusky dorsal dashes; powdery; appendages dusky. Body length 1.5-1.9; wing 2.3; hamuli 2 in number; hind tibia .57-.65; hind tarsal II .18-.19; antenna .9-1.3. Rostrum attaining abdominal III. Hairs pointed, and sparse. Cauda bearing one pair of short hairs.

Ovipara. Apterous. Lemon-yellow, brown on head, dorsal abdominal patches and lateral areas; appendages pale to slightly dusky. Measurements as in apterous summer vivipara.

Male. Apterous. Color as in ovipara. Body length .50; antenna .25, III and IV more or less coalesced; hind tibia .13; hind tarsal II .06.

Collections. On twigs of *Abies lasiocarpa* and *Picea pungens.* Colorado: Laramie-Poudre Tunnel, Pingree Park and Fort Collins. Utah: Mount Timpanogos, Beaver Mountain, Wolf Creek Canyon, Card Canyon, south of Logan Canyon, Aspen Grove, Draper and Mount Nebo. Wyoming: Yellowstone Park. Fundatrices May 23, apterous and alate viviparae June 7 to Aug. 12, sexuales June 25; not common.

Subfamily **Eriosomatinae** Kirkaldy

Kirkaldy, 1905:418.

Characters. Vertex convex; frontal tubercles lacking. Eye in fundatrix three-facetted, more or less rudimentary in summer aptera, compound in alata. Wax glands present. Secondary sensoria on antenna transverse or annular. Unguis shorter than base of VI (except in fundatrigenia of *Mordvilkoja*). Hairs inconspicuous (except in *Asiphum*). Cornicle rudimentary or absent. Cauda semilunar, inconspicuous. Fore wing with media once-forked or simple. Rostrum four-segmented, i.e. with V indistinct and rudimentary. Sexuales degenerate, small and without rostrum; ovipara laying but a single egg and hind tibia without sensorialike structures; male apterous and without secondary sensoria on antenna.

Living concealed in galls, pseudo galls, underground on roots, in ants nests or exposed on plants but covered with cottony secretion.

Key to Tribes of Eriosomatinae

1. Wax glands composed of a row of facets surrounding a central space; cornicle distinct, a pore usually on slight mammiform base. (p. 347)........*Eriosomatini*

.... Wax glands not composed of row of facets around central space; cornicle indistinct, merely a ring or absent 2

2. Secondary sensoria suboval to narrow and transverse. Living in galls or pseudo galls on primary host (except *Prociphilus venafuscus* Patch, on bark), on roots or stems on secondary host. (p. 354)........*Pemphigini*

.... Secondary sensoria oval to suboval. Living subterranean and with ants; primary host unknown in U.S.A. (p. 372)........*Fordini*

Tribe **Eriosomatini** Baker

Baker, 1920a:65.

Characters. Secondary sensoria on III of alata usually annular. Otherwise as given in key and under subfamily.

Key to Genera of Eriosomatini

1. Tarsi distinctly two-segmented in all forms; hind wing with 2 cross-veins........ 2

.... Tarsi with suture between I and II indistinct or lacking in aptera; hind wing with one cross-vein or simple. (p. 347)........*Colopha*

2. Fundatrix with antenna five-segmented; cornicle not apparent (p. 349)........*Eriosoma*

.... Fundatrix with antenna four-segmented; cornicle apparent (p. 353)........*Gobiashia*

Genus **Colopha** Monell

Monell, 1877:102; Baker, 1920a:66; Maxson, 1923:316.

Characters. Antenna four-segmented in fundatrix, five-segmented in summer vivipara, six-segmented in alate vivipara; secondary sensoria in alata annular. Tarsal I not distinctly separated in aptera. Media of fore wing simple or once-forked; cubitus absent or rudimentary in hind wing. Cornicle on mammiform base or lacking. Living subterranean or in galls.

Genotype (monotypical), *Byrsocrypta ulmicola* Fitch.

Colopha appears synonymous with *Tetraneura* Hartig if *Aphis ulmi* Geoffroy (n.n. *T. ulmifoliae* Baker) (the species that Hartig described but named "*Aphis ulmi* L. ?") is considered genotype. However, this procedure is contrary to Opinion 65, in accordance with which *Aphis ulmi* L. would be genotype which would place the genus *Tetraneura* with *Eriosoma*.

Genotype *Colopha ulmicola* (Fitch)

The Cockscomb Aphid of Elm

Byrsocrypta ulmicola Fitch, 1859:843.
Tetraneura graminis Monell, 1882:16; Patch, 1910b:196 and 208; Gillette and Palmer, 1943:214.
Colopha graminis, Hottes and Frison, 1931a:348.
Colopha ulmicola, Baker, 1920a:66; Cutright, 1925:200 (synonymy); Hottes and Frison, 1931a:349.

Fundatrix. Pale yellow; head and appendages blackish. Body length 1.5-2; hind tibia .23-.29; hind tarsal II .04-.06, I united with II; antenna .20; rostrum attaining 2d coxa. Her young are heavily covered with fluffy white secretion.

Apterous Summer Vivipara. (On elm in gall), body length 1.7; antenna .20, six-segmented, III .03, IV .02-.04, V .02-.04, VI .04+.01; hind tibia .22; cornicle lacking. (On grass), dull sordid yellow without markings except, especially in nymph, a narrow sharply defined white median dorsal line on head and thorax. Body length 1.5-1.8; hind tibia .15-.20; hind tarsal II .04-.06; antenna .17; rostrum attaining between 1st and 2d coxae. Tarsal I indistinct.

Alate Vivipara. Head and thorax black; prothorax and abdomen green to yellow-brown or black; legs dusky; antenna black. Body length 1-1.6; hind tibia .35-.50; hind tarsal II .08-.10; antenna .40-.50; rostrum attaining between 1st and 2d coxae. Cornicle lacking. Cauda minute, semilunar. Hairs inconspicuous. Fore wing with media usually simple but occasionally once-forked.

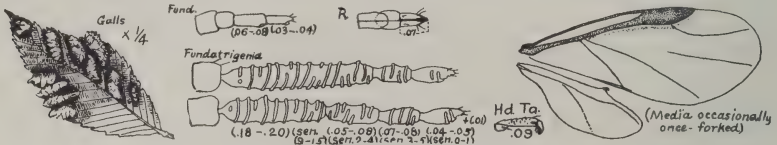
Galls
× 1/4
Fund.
(.06-.08)(.03-.04)
R
.07
Fundatrigenia
+(.01)
(.18-.20)(sen. 9-15)(.05-.08)(Sen. 2-4)(.07-.08)(sen 2-5)(.04-.05)(sen. 0-1)
Hd. Ta.
.09
(Media occasionally once-forked)

Fig. 417. *Colopha ulmicola*

Collections. As winter host in cockscomb galls on leaves of *Ulmus americana;* as summer host on leaves of rice cut-grass *(Leersia oryzoides).* Colorado: Boulder, Holyoke and Fort Collins. Fundatrices on winter host June 8 to July 3, apterous summer viviparae in galls (very scarce) July 3 and on grass July 22 to Sept. 18, alate viviparae on elm June 12 to July 23 and on grass Sept. 1 to 29, rather common.

Colopha ulmisacculi (Patch)

Tetraneura ulmisacculi Patch, 1910b:216; Gillette and Palmer, 1934:215.
Tetraneura ulmifoliae Baker, 1920a:68 (n.n. for *Aphis ulmi* Geoffroy which is preoccupied).

Fundatrix. Newly Hatched. Deep black. *Adult.* Dark green, mottled, head and prothorax brown; slightly powdery; appendages dusky. Body length 2.1; hind tibia .30; hind tarsal II .07; antenna .25, four-segmented; rostral IV+V .09 surpassing 2d coxa.

Hibernating Vivipara. Flesh-ochre to pinkish cinnamon, lighter yellowish laterally; brown on head; appendages slightly brownish. Body length 2.5; hind tibia .40; hind tarsal II .10; antenna five- or six-segmented, .45-.56; rostral IV+V .23; surpassing 2d coxa. Cornicle distinct, on mammiform base. Tarsal I and II entirely coalesced. Hairs very sparse, short and drooping.

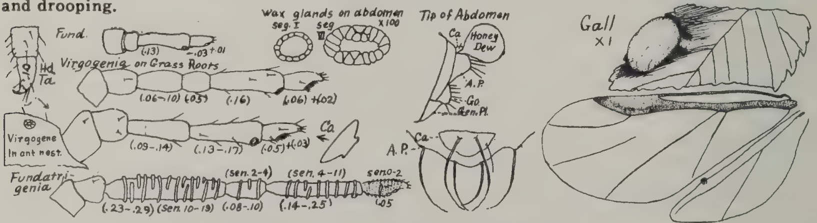

Fig. 418. *Colopha ulmisacculi*

Alate Vivipara. Fundatrigenia. Head and thorax dull black; abdomen dark brownish green; appendages sordid ochre. Body length 2.1; wing 2.5; hind tibia .50-.60; hind tarsal II .14; antenna .65-.85; rostral IV+V .15, not attaining 2d coxa. Cauda rounded, bearing 2 long hairs. Cornicle mere rim on slightly raised base. Fore wing with media usually simple rarely once-forked; hind wing with one cross-vein. *Sexupara.* Same except rostral IV+V .20.

Ovipara. Apterous. Honey-yellow to cinnamon-yellow; appendages pale yellowish. Body length .84; antenna .13, three- or four-segmented; hind tibia .12; hind tarsal II .03; tarsal I and II completely coalesced, tip of II bearing a pair of capitate hairs. Rostrum missing.

Male. Apterous. Dark brownish green, pale anteriorly on thorax and head; appendages pale. Body length .51; antenna .10, four-segmented; hind tibia .10. Rostrum missing.

Collections. On winter host, in bladderlike galls on upperside of leaves of *Ulmus campestris;* on summer host, on roots of *Agroypron* sp. and other grasses. Colorado: Cherokee Park and Fort Collins. Fundatrices on elm May 7 to June 20, hiberating viviparae in ants' nests and on grass roots April 2 to May 24, summer apterous viviparae on grass roots throughout the summer, alate viviparae on elm (fundatrigeniae) June 27 to July 12 and (sexuparae) Aug. 31 to Nov. 4 and on grass June 29 to Oct. 8, sexuales Sept. 19; common.

Genus **Eriosoma** Leach

Leach, 1818:60; Baker, 1920a:66; Davidson (J.), 1925:101.

Characters. Vertex convex; frontal tubercles lacking. Antenna five-segmented in fundatrix and sexuales, six-segmented in summer viviparae; secondary sensoria annular. Wax glands present on viviparae; composed of facets surrounding a center. Cornicle distinct ring on slightly mammiform base. Cauda and anal plate rounded. Hairs pointed, very short and inconspicuous. Fore wing with media once-branched; hind wing normally with both media and cubitus. Living in pseudo galls or on roots or exposed on plants but covered with waxy secretion.

Genotype (monotypical), *Aphis lanigera* Hausmann.

Key to Species of Eriosoma

1. III shorter than IV+V+VI in alate and apterous viviparae. In rolled leaves of *Ulmus americana* and on roots and leaves of *Amelanchier* sp. (p. 349)..............*americanum*
.... III not shorter than IV+V+VI in alate and apterous viviparae.......................... 2
2. Media of fore wing with fork distinctly distad of origin of radial sector. On bark of *Ulmus* (p. 353) ....*rileyi*
.... Media of fore wing with fork not distinctly distad of origin of radial sector....................... 3
3. Sensoria on V, 4-6 (p. 351) ....*lanigerum*
.... Sensoria on V, 6-10. On bark of branches of *Crataegus* (p. 350)..........................*crataegi*

Eriosoma americanum (Riley)

The Woolly Elm Aphid

Schizoneura americana Riley, 1879:4.
Eriosoma americanum, Patch, 1915:197; Maxson, 1923:313; Gillette and Palmer, 1934: 211.

Fundatrix. Sordid amber to mottled olive-green to blackish; darker on head, cauda and anal and genital plates; woolly; appendages and rostrum pale yellowish to dusky. Body length 2.4-3.0; hind tibia .45; hind tarsal II .13; antenna .50-.54; rostrum attaining between 2d and 3d coxae. Cornicle not evident.

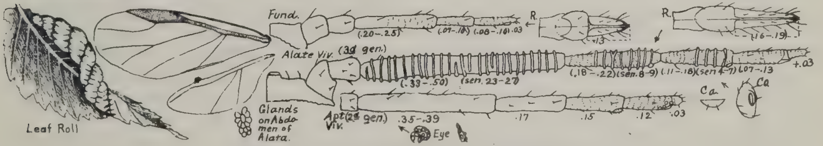

Fig. 419. *Eriosoma americanum*

Apterous Summer Vivipara. Fundatrigenia (on elm). Pale with head and anal and genital plates black or blackish; rostrum and appendages dusky except lighter on antennal III. Body length 2.30; antenna 1.03; hind tibia .75; hind tarsal II .20; rostral IV+V .15, attaining 2d coxa. Cornicle mere pore or slightly raised rim on slightly raised base which is surrounded by a row of hairs.

Alate Vivipara. (On Elm). Dark green to slaty-black; woolly; head, thorax, cauda and anal and genital plates, appendages, cornicle, rostrum, stigma and costal and subcostal veins black or blackish. Body length 2-2.5; hind tibia .8-1.2; hind tarsal II .16-.22; antenna 1-1.26; fore wing 3-3.8; rostrum attaining 2d coxa. Wax glands evident as circles surrounding a central space. Cornicle mere rim surrounded by slightly raised base which is surrounded by a ring of short spinelike hairs.

Apterous Summer Vivipara. (On *Amelanchier*). Light pink; woolly.

Alate Vivipara. **(On *Amelanchier*). Same as alate vivipara on elm.**

Ovipara. **Apterous. Bright yellow to sordid amber; appendages pale. Body length .7; antenna .18; legs short and stout; tarsi one-segmented; rostrum lacking. Laying single egg.**

Male. **Apterous. Brown. Body length .4; antenna .2 long, five-segmented; rostrum lacking.**

Egg. **Newly laid, bright, shining yellow almost orange; later, black. Size .50 by .20.**

Collections. As winter host, in curled leaves of *Ulmus americana,* (leaves rolled on underside); as summer host, roots, base of trunk and leaves of *Amelanchier alnifolia.* Throughout region. Fundatrices on elm May 18 to June 24; apterous summer viviparae on elm May 19 to July 19 and Sept. 28, on *Amelanchier** June 9 to Oct. 23; alate viviparae (spring migrants) on elm leaves June 2 to July 26, on elm** bark (fall migrants) Aug. 24 to Oct. 18, on *Amelanchier** July 9 to Sept. 20; sexuales Oct. 6; common.

Chief Distinguishing Characters. Length of IV, V and VI (sum of which exceeds length of III in alata), length of III in fundatrix (.20-.25) and nature of leaf deformation on elm.

This species is very close to *E. lanigerum.*

Eriosoma crataegi (Oestlund)

Schizoneura crataegi **Oestlund, 1887:27.**
Eriosoma crataegi, **Baker, 1915:15; Gillette and Palmer, 1934:211; Heriot, 1938: Feb. 16; Cox, 1939:477.**

Apterous Summer Vivipara. **Dark slaty; appendages brownish; woolly secretion forming two long filaments from tip of abdomen, covering on dorsum dense and felty, not fluffy. Body fluid from crushed specimens dark brown to black. Body length 2-3; across eyes .43; hind tibia .55-.70; antenna .70-.80; rostrum attaining 3d coxa. Cornicle showing as a large pore, .10 in diameter, with chitinized bow on medioanterior side and on slightly raised base which bears scattered short hairs. Wax glands in four rows, one pair dorsal and one lateral.**

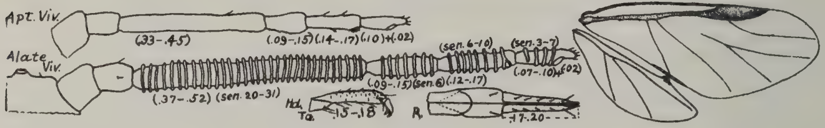

Fig. 420. *Eriosoma crataegi*

Alate Vivipara. **Head and thorax dull black; abdomen slaty black, slightly lighter on the ventral surface; antenna, rostrum and legs brownish; dorsum with secretion in cottony projections. Body length 2.1-3; across eyes .42; antenna .77-1.10; hind tibia .80-1; rostrum attaining hardly to 2d coxa. Cornicle a mere pore .05 in diameter, with chitinized bow halfway around and on slightly raised base which bears scattered short hairs. Fore wing 4.1 long.**

Ovipara. **Apterous. Golden yellow, often with head slightly green. Eyes black. Body length .75; antenna .16; legs very short, anterior pair very little longer than antenna. Rostrum lacking.**

Male. **Apterous. Dusky yellow. Size much smaller than female; antenna apparently six-segmented, V longest. Rostrum lacking.**

Collections. On stems of *Crataegus* sp. Colorado: Denver, Boulder and Fort Collins. Apterous summer viviparae July 8 to Oct. 3, alate viviparae Sept. 3 to Oct. 27, oviparae obtained Nov. 2 (deposited by imprisoned fall migrants); not common. They seem to all leave the *Crateaegus* in the fall.**

*The alternate, summer host, *Amelanchier* sp. has been demonstrated by Patch (op. cit.) and confirmed by L. C. Bragg co-worker here but the specimens here listed have been determined by comparison as have the fall migrants on elm bark in the fall and there may be some uncertainty as to whether the sexual forms are confused with the rosette forming species.

**Heriot (op. cit.) reports this species as migrating to *Ulmus americana* and there producing leaf-cluster galls. However, Cox (op. cit.) maintains that this species does not migrate to elm.

On leaves and tender twigs of *Ulmus fulva* we have taken a form which seems structurally indistinguishable from *E. crataegi*. It causes a leaf-curl cluster similar to *E. lanigerum* on *Ulmus americana* but differs from that species in the character of the secretion which froms long filiments instead of forming a fluffy covering; also time of leaving the galls by spring migrants was observed to be later in this form. Colorado: Denver and Fort Collins. Apterous and alate viviparae July 11 to 24 and Sept. 11 to Oct. 19; in large colonies; rare.

Chief Distinguishing Characters. Black color of body also appearing in crushed specimens, two long filaments of cottony secretion extending posteriorly and dense felty covering on dorsum instead of fluffy mass, large size of body, large cornicle pore (.10 in diameter in apterous vivipara, .05 in alate vivipara) and number of sensoria (3-7) on base of VI.

Genotype *Eriosoma lanigerum* (Hausmann)

The Woolly Apple Aphid (Plate VI)

On apple:

Aphis lanigera Hausmann, 1802:440.
Schizoneura lanigera, Gillette, 1908d:306 and 1915a:100; Patch, 1913b:264 and 1916: 330; Baker, 1915:1; Maxson, 1915:367.
Eriosoma lanigerum, Becker, 1918:3; Simms, 1927; Marchal, 1928:1; Theobald, 1929: 275; Hori, 1930:35; Gillette and Palmer, 1934:210; Schoene and Underhill, 1935:1; Heriot, 1938: Feb. 16; Cox, 1939:477.

On elm:

Schizoneura americana Riley, (misidentification), Gillette, 1898: Fig. 32.
Schizoneura lanigera, Patch, 1913b:264 and 1916:329.
Eriosoma lanigerum, Gillette and Palmer, 1934:210.
Eriosoma rosetti Gillette (in List and Gillette), 1936:3 (nomen nudum).
Eriosoma crataegi (Oestlund), Heriot, 1938: Feb. 16.

Hibernating Young Apterous Vivipara. Very dark dusky green, appearing nearly black especially on head and thorax; often dingy yellowish brown, lighter after feeding; naked; appendages and distal end of rostrum dusky brown. Body length .65-.75; antenna .27, five-segmented; a pair of hairs at bases of tarsal claws slightly knobbed.

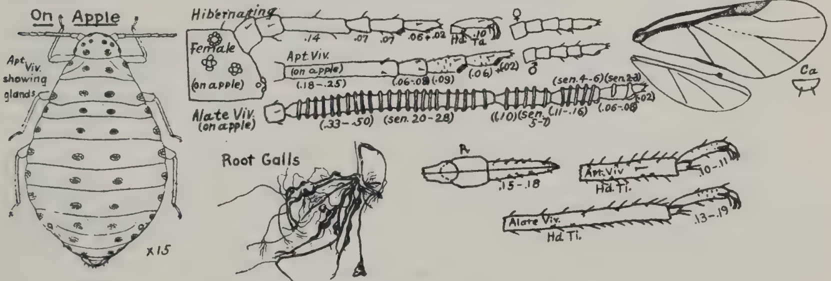

Fig. 421. *Eriosoma lanigerum* on apple

Apterous Summer Vivipara. Pinkish to reddish brown, darker on tip of abdomen; covered with fluffy waxy secretion; antenna dusky, tibiae yellowish to slightly dusky. Body length 2-2.5; across eyes .45; hind tibia .50; antenna .55-.59; cornicle with pore .06-.07 in diameter, on slightly raised base which bears scattered hairs; rostrum attaining 2d-3d coxa.

Alate Vivipara. Color same as apterous summer vivipara. Body length 2.2; across eyes .45; fore wing 2.8; hind tibia .75-.90; rostrum hardly attaining 2d coxa; cornicle with pore .05 in diameter.

Ovipara. Apterous. Rusty yellow to rusty brown. Body length .85; antenna .20, five-segmented, III+IV (coalesced) .045, V .047, VI with unguis .047. Cornicle and rostrum obsolete.

Male. Apterous. Yellowish to dusky brown to dark green. Body length .50-.55; antenna .20, heavy, III+IV (coalesced) .047, V .037, VI with unguis .063. Cornicle and rostrum obsolete.

Collections. On apple *(Malus* sp.*)*, on twigs, roots causing galls, but especially on bark, in crevices of swellings caused by their feeding. Throughout region. Apterous summer vivparae all months of the years (hiberating viviparae during the fall and winter), alate viviparae June 20 and Aug. 22 to Oct. 29 (especially numerous during September), sexuales Sept. 6 to 26 (obtained only by confining fall migrants leaving apple); very common and often injurious.

Chief Distinguishing Characters. Reddish brown body and blood-red stain when crushed, fluffy flocculent covering of secretion, number of sensoria on VI of alate vivipara (2-3), small size of cornicle pore (.06-.07 in diameter in aptera, .05 in alata) and the habit of feeding on bark and roots and causing gall growth on roots and swelling on bark.

Though the eggs are considered by Patch (1913b:264 and 1916:330), Baker (1915:1), Becker (1918:3), Maxson (1915:367) and Schoene and Underhill (1934:1) to be laid on elm, elm is not necessary for the existence of this aphid as they commonly hibernate on the apple in the apterous viviparous state. In some heavily infested sections of the western part of Colorado elm leaf-cluster galls have been rare or unknown, during the thirty-year period of observations by workers here. This species is reported as existing independent of the elm in continental Europe by Marchal (1928:1), in Japan by Hori (1930:35) and in Poland by Simms (1927) and in Canada by Heriot (op. cit.).

On elm:

Fundatrix.* *Young Adult. **Sordid yellowish brown or cinnamon-brown, with head, prothorax, tip of abdomen, and appendages including coxae dusky to black; venter lighter; dorsum heavily covered with flocculence.** ***Older Adult.*** **Dark slaty, almost black; head, and appendages black. Body length 2-2.6; hind tibia .36-.40; antenna .46-.55; rostrum attaining 2d or 3d coxa.**

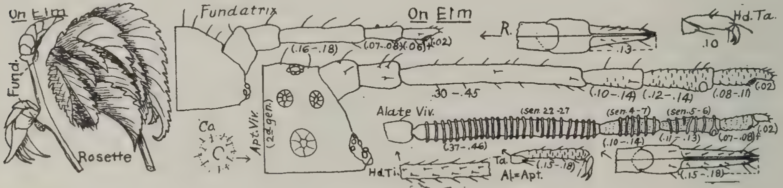

Fig. 422. *Eriosoma lanigerum* on elm

Apterous Summer Vivipara. **(Second generation).** ***Young.*** **Newborn, very pale yellow with head dusky; appendages slightly dusky, nearly transparent; dorsum soon becoming covered with flocculence. After feeding, light rusty brown.** ***Adult.*** **Pink with head and posterior end of abdomen somewhat dusky; antenna dusky; entire body heavily covered with flocculence. Body length 2.5; antenna .82-1; hind tibia .75; rostral IV+V .20, attaining 2d coxa. Cornicle mere ring .06-.07 in diameter with chitinized bow on medioanterior side and on slightly raised base which bears scattered short hairs. A few apterae present in this generation but the great majority are alatae.**

Alate Vivipara. **Head and thorax blackish brown; prothorax and abdomen yellowish brown to rusty brown; covered with flocculence; appendages, rostrum, cornicle, cauda and anal plate dusky. Body length 2.2; antenna .82-1; hind tibia .75-.86; rostrum attaining between 1st and 2d coxae. Cornicle pore .05-.06 in diameter.**

Collections. On *Ulmus americana,* in curled terminal leaf-clusters. Colorado: Longmont, Kiowa, Castle Rock and Fort Collins. Fundatrices Apr. 23 to June 20, apterous and alate summer viviparae May 13 to July 25, elm deserted after July; not very common.

Type. U.S.N.M., No. 59324. Paratypes, Colo. Agr. Exp. Sta. Collection.

This species is considered by Patch (1913b:264 and 1916:329), Baker (1915:1), Becker (1918:3) and Maxson (1915:367) to migrate to apple and to be *E. lani-*

gerum and by Heriot (1938:Feb. 16) to be *E. crataegi* (Oestlund). Cox (1939:477) however reports elm leaf-cluster aphid transfer attempts to *Crataegus* to have been unsuccessful.

Failure to establish evidence of migration between elm and apple has been reported by workers in nearly all parts of the world; namely, Simms (1927) in Poland, Marchal (1928:1) in France and Hori (1930:35) in Japan. As far as is known to the writer this species has not been traced through the complete life cycle from apple to the developed leaf cluster and back to the apple by anyone.

Eriosoma rileyi (Thomas)

The Woolly Aphid of the Elm Bark

Eriosoma ulmi Riley, 1869:123 (preoccupied).
Eriosoma rilepi Thomas, 1876 (1877):191 (lapsus calami for *rileyi* new name for *Eriosoma ulmi* Riley).
Eriosoma rileyi, Patch, 1910b:235 and 1913b:260; Hottes and Frison, 1931a:354: Gillette and Palmer, 1934:212.

Fundatrix. Dark chestnut-brown, dusky on head, lighter on thorax and venter (much lighter when mounted in alcohol); cottony; appendages dusky. Size 2.25 by 1.60; antenna .35; hind tibia .30. Cornicle not apparent. *Young.* Deep pink.

Apterous Summer Vivipara. Light flesh color with antenna same as body; powdery. Body length 2; hind tibia .53-.55; hind tarsal II .13; antenna .45-.54; rostrum attaining between 2d and 3d coxae.

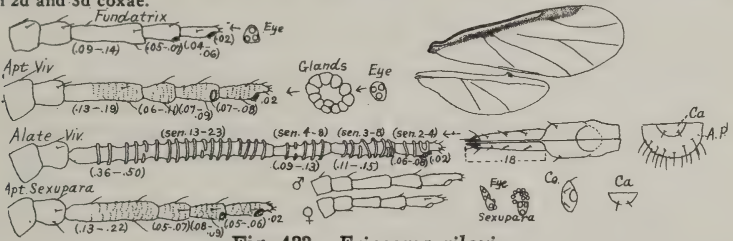

Fig. 423. *Eriosoma rileyi*

Alate Vivipara. Head and thorax black; abdomen slightly lighter; more or less powdery; appendages black. Body length 2.25; across eyes .43; hind tibia .70; hind tarsal II .14; fore wing 3.1; antenna .77-.84; cornicle pore .03-.04 in diameter.

Apterous Sexupara. Dull yellow-brown; woolly; cornicle and appendages dusky brown. Body length 1.75; antenna .63, five- or six-segmented; hind tibia .35.

Ovipara. Apterous. Light yellowish; with little tufts of secretion on dorsum. Body length .73-.80; antenna .17-.19; five-segmented, III+IV .035, V .045, VI .04+.02; hind tibia .13; hind tarsal II .05; rostrum lacking; cornicle not apparent.

Male. Apterous. Greenish yellow; with cottony tufts. Body length about .50; antenna .17. Rostrum missing; cornicle not apparent.

Egg. Newly laid, yellow to dusky brown. Size .45-.50 by .22-.25. Laid singly beneath scales of bark.

Collections. On bark of trunk and roots near crown of *Ulmus americana*, not producing galls. Colorado: Sterling, Fruita, Rocky Ford, Denver and Fort Collins. Fundatrices May 24 to 31, apterous and alate summer viviparae June 13 to July 24 and Sept. 4 to Oct. 12, apterous sexuparae Oct. 2, sexuales Oct. 23 to 29, rather common at times.

This species is distinguished from *E. americanum* and *E. lanigerum* by the shorter antenna of the fundatrix and the narrower secondary sensoria with wider intervening spaces in the alate vivipara.

Genus **Gobaishia** Matsumura

Matsumura, 1917:75; Baker, 1920a:67; Maxson, 1923:316.

Characters. Antenna four-segmented in fundatrix, six-segmented in summer viviparae; secondary sensoria in alate vivipara annular. Tarsi two-segmented. Media of fore wing once-forked or simple; hind wing with both media

and cubitus. Wax glands consist of single row of facets surrounding an irregular area; feebly developed.
Genotype (fixed by Matsumura, 1917), *Gobaishia japonica* Matsumura.

[Genotype *Gobaishia japonica* Matsumura]

Gobaishia japonica Matsumura, 1917:76; Mordvilko, 1935:118.

Not described on account of unavailability of specimens.

Gobaishia ulmi-fusa (Walsh and Riley)

Pemphigus ulmi-fusus Walsh and Riley, 1869:109, footnote; Patch, 1910b:220.
Gobaishia ulmi-fusus, Hottes and Frison, 1931a:359; Gillette and Palmer, 1934:213.

Fundatrix. Body length 2; hind tibia .35; hind tarsal II .10; antenna .26; rostrum attaining between 1st and 2d coxae.

Alate Vivipara. Body length 1.45; hind tibia .55; antenna .60-.70; rostrum as in aptera.

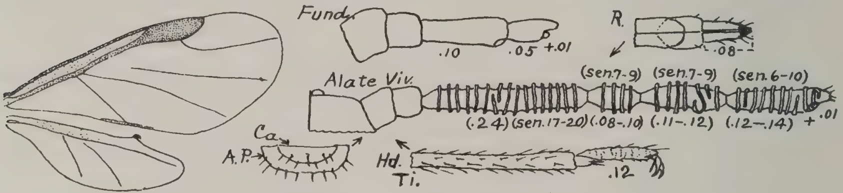

Fig. 424. *Gobaishia ulmi-fusa*

Collections. In spindle-shaped baglike galls about 25 mm long on upper surface of leaves of red or slippery elm *(Ulmus fulva)*. Colorado: Longmont. Fundatrices and alate viviparae July 15. (Host plant is rare in this locality.)

Tribe **Pemphigini** Baker

Baker, 1920a:68.

Characters. As given under Eriosomatinae, in description and key to tribes.

Key to Genera of Pemphigini

1. Fore wing with media usually once-forked (p. 355) .... *Asiphum*
.... Fore wing with media simple 2
2. Vertex in aptera, with median hornlike projection, in alata merely somewhat produced (p. 357) .... *Cornaphis*
.... Vertex but slightly convex 3
3. Unguis bearing sensoria and in alate fundatrigenia longer than base of VI (p. 358) .... *Mordvilkoja*
.... Unguis not bearing sensoria and in all alate viviparae shorter than base of VI 4
4. Antenna of fundatrix four-segmented. Living in true galls (p. 358) .... *Pemphigus*
.... Antenna of fundatrix five-segmented. Not living in true galls 5
5. Wax glands on dorsum of mesothorax of alata large, i.e., with diameter equal to intervening distance. Fundatrix not in gall by herself (p. 366) .... *Prociphilus*
.... Wax glands not well developed on dorsum of mesothorax of alata, i.e., with diameter less than distance between glands. Fundatrix in a gall by herself (except *patchii* Gillette) (p. 369) .... *Thecabius*

Genus **Asiphum** Koch

Koch, 1856:246; Gerstaecker, 1859:249 (type fixation); Baker, 1920a:75; Theobald, 1929:217.

Characters. Vertex convex; frontal tubercles lacking. Wax plates composed of many equal-sized facets surrounded by chitinous ring; present in alate vivipara. Antenna five-segmented in fundatrix, six-segmented in alate vivipara; secondary sensoria transverse. Cornicle absent. Cauda rounded, semilunar. Fore wing with media once-forked; hind wing with both media and cubitus present.

Living in pseudo galls on leaves.

Genotype (fixed by Gerstaecker, 1859), *Aphis populi* Fabricius (=*tremulae* De Geer).

Key to Species of Asiphum

1. Fore wing smoky; hairs in aptera prominent, on antenna longer than diameter of antenna (p. 356) .... *sacculi*

.... Fore wing hyaline; hairs prominent on antenna of aptera (p. 356).................. *tremulae*

.... Fore wing hyaline; hairs inconspicuous, not longer than diameter of antenna.................. 2

2. Hind tarsal II of alata shorter than 1.5 times antennal IV; hind tibia shorter than 3 times III (p. 355) .... *pseudobyrsum*

.... Hind tarsal II of alata nearly twice as long as antennal IV; hind tibia 3 times as long as III (p. 355) .... *rosettei*

Asiphum pseudobyrsum (Walsh)

The Poplar Leaf-purse Aphid

***Byrsocrypta pseudobyrsa* Walsh, 1862:306.**
***Pemphigus pseudobyrsa*, Oestlund, 1887:24.**
***Schizoneura populi*, (misidentification), Gillette, 1908e:1.**
***Asiphum pseudobyrsa*, Gillette, 1914a:269; Hottes and Frison, 1931a:348; Gillette and Palmer, 1934:217.**

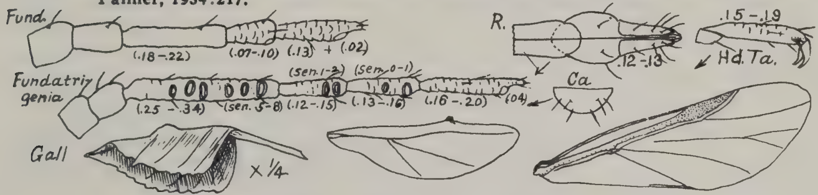

Fig. 425. *Asiphum pseudobyrsum*

***Fundatrix.* Yellow-olive-green, head blackish; heavily powdered; appendages dusky. Body length 4; hind tibia .50; hind tarsal II .13-.15; antenna .55-.65 rostrum attaining 2d coxa.**

***Alate Vivipara.* Dusky to black; cottony; appendages pale yellow; venation faint with black line along subcosta. Body length 3.5; fore wing 3.50-3.75; hind tibia .65-.75; antenna .80-.97; permanent sensoria with cilia; rostrum attaining between 1st and 2d coxae. Wings hyaline; subcosta of fore wing bordered by black line; media usually once-forked, occasionally simple. Wax glands indistinct, composed of many equal-sized facets; present in alate vivipara. Hairs inconspicuous, .04-.05 on vertex, tibiae and body.**

Collections. In pseudo galls of leaves of *Populus sargenti**. Colorado: Grand Junction, Rocky Ford, La Porte, Denver, Longmont and Fort Collins. Fundatrices May 27 to June 18, alate viviparae June 16 to July 13; not common. Fundatrix living in same leaf as progeny but on underside of midrib with young locating on underside of branch veins. Second generation alate viviparae (fundatrigeniae) all leave the tree, probably for an unknown summer host.

Asiphum rosettei Maxson

The Aspen Rosette Aphid

***Asiphum rosettei* Maxson, 1934:40; Gillette and Palmer, 1934:218. ..**

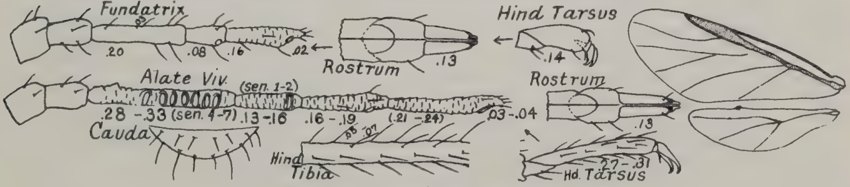

Fig. 426. *Asiphum rosettei*

***Fundatrix.* (Mounted in balsam), head, appendages light brown. Body length 2.76; hind tibia .48; antenna five-segmented, .60. Hairs pointed and sometimes curved; on hind tibia and side of abdomen .05-.07 long. Rostrum attaining 2d coxa.**

***Note by Gillette (1914a:269) that host is *Populus coccinea* is an error.**

Alate Fundatrigenia. (Mounted in balsam), head, thorax and appendages light brown. Stigma pale yellowish brown. Body length 2.2; hind tibia .9-1.05; antenna six-segmented, 1.03-1.08; fore wing 4; rostrum as in fundatrix. Hairs pointed and sometimes curved; on III .03, sparse; on hind tibia .03. Wax glands present on metathorax, with diameter shorter than distance between glands. Hind wing with media and cubitus rising either together or apart.

Collections. On petioles and leaves of *Populus tremuloides,* causing leaves to be bent backward at base and stunting stems so as to form a rosette; (fundatrix feeds on petiole and fundatrigeniae on unexposed side of leaves). Colorado: Canyon of South Saint Vrain (in Boulder County). Fundatrix and fundatrigeniae in July; very rare.

Type. U.S.N.M., No. 50066. Paratypes, A. C. Maxson Collection.

Asiphum sacculi Gillette

The Aspen Leaf-pocket Aphid

Asiphum sacculi Gillette, 1914b:65; Gillette and Palmer, 1934:217.
Pemphiglachnus kaibabensis Knowlton, 1938a:264.

Fundatrix. Slaty-gray with head brown; covered with fine powder; appendages brown. Body length 4.5-5; hind tibia .7-.8; hind tarsal II .16; antenna .60-.76; rostrum surpassing 3d coxa. Hairs on vertex .10; on hind tibia .06; on side of body .08-.10.

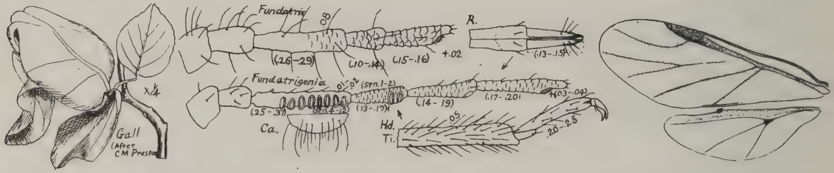

Fig. 427. *Asiphum sacculi*

Alate Vivipara. Head and thorax black; prothorax and abdomen olive-green, appearing blackish; antenna blackish; tibiae yellowish; fore wing slightly smoky. Body length 3-4; hind tibia .85-1.1; antenna .92-1; rostrum attaining 2d coxa. Hairs on vertex .05-.08; on side of abdomen .08-.10.

Collections. In pseudo gall of crumpled leaves with edges turned in, on *Populus tremuloides.* Colorado: Estes Park, Manitou, Pingree Park, Skyway and Ward. Fundatrices June 13 to Aug. 9, alate viviparae June 13 to Aug. 20; not common.

Type. U.S.N.M., No. 41930. Paratypes, Colo. Agr. Exp. Sta. Collection.

Chief Distinguishing Characters. Character of pseudo gall, slightly smoky fore wing, length of hind tarsal II of fundatrigenia (slightly shorter than antennal III and equal to antennal VI) and character of hairs on antenna of fundatrix (prominent, length exceeding diameter of segment bearing them).

[Genotype *Asiphum tremulae* (De Geer)]

Aphis tremulae Linnaeus ?, 1761:261; De Geer, 1773:94.
Aphis populi Fabricius, 1794:215 (preoccupied).
Asiphum tremulae, Tullgren, 1909:64.

Fundatrix. Dark silver-gray with several more or less distinct dark crossbands. (In alcohol), yellow-brown with blackish brown head and sometimes somewhat lighter legs. Body thickly covered with relatively long and very fine hairs. Body length 5-6. Antenna five-segmented, .627; hind tibia .72; hind tarsal II .215. Hairs sparse and long on antenna.

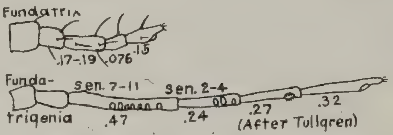

Fig. 428. *Asiphum tremulae*

Alate Vivipara. Fundatrigenia. Head and thorax more or less blackish brown; appendages, especially antenna distinctly paler; abdomen brownish; slightly powdery. Wax glands

well developed, composed of small polygon and often irregularly shaped patches, surrounded by a distinct chitinous margin and often armed with a few or more long bristles; a pair of plates on mesonotum; on abdominal I to VII normally 4 longitudinal rows but dorsal rows often joined and on abdominal VIII only two plates. Body length 3.8; antenna 1.5; hairs on antenna very sparse; hind tibia 1.52; hind tarsal II .39; fore wing 5.3, media once-forked.

Biology. Living on *Populus tremula,* fundatrix on bark of young twigs, fundatrigenia on leaf petioles which their feeding distorts so as to cause a sharp bend at the junction with the leaf and clustering of otherwise normal leaves. During July alatae develop and fly away so that by August practically none remain. Summer host is unknown.

The above description and figure were adapted from figure and description by Tullgren (op. cit.). (Not taken in region.)

Genus **Cornaphis** Gillette

Gillette, 1913:491; Gillette and Palmer, 1934:219.

Characters. Vertex produced, in summer vivipara forming a horn, in alata forming a raised base for the ocellus; frontal tubercles lacking. Cornicle present as a mere ring or absent. Antenna five-segmented in fundatrix, six-segmented in alata, secondary sensoria narrow-oval and transverse. Cauda semilunar. Media of fore wing simple; hind wing with both cubitus and media. Wax plates composed of many equal facets surrounded by a ring, present in summer aptera. Sexuales apterous and without rostrum.

Living in pseudo galls on leaves; fundatrix in same gall as progeny.

Genotype (monotypical), *Cornaphis populi* Gillette.

Genotype *Cornaphis populi* Gillette

The Crescent-gall Poplar Aphid

Cornaphis populi **Gillette, 1913:491; Gillette and Palmer, 1934:219.**

Fundatrix. **Slaty-gray with head black and 4 spots on pronotum; powdery; appendages black. Body length 2.75; hind tibia .31-.35; hind tarsal II .10-.12; antenna .40; rostrum attaining between 2d and 3d coxae. Wax plates absent. Cornicle not evident.**

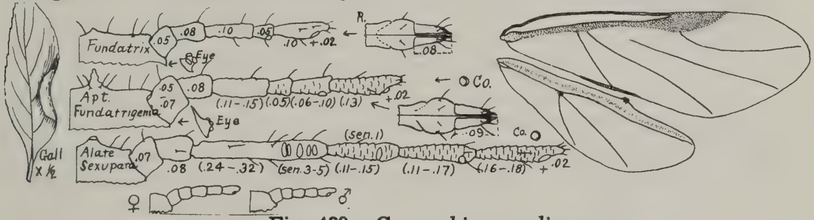

Fig. 429. *Cornaphis populi*

Apterous Vivipara. Fundatrigenia. **Light straw-yellow with head and 4 patches on pronotum black; powdery; appendages dusky. Body length 2-2.25; hind tibia .40-.50; hind tarsal II .13-.15; antenna .58; rostrum attaining 3d coxa. Cornicle mere ring.**

Alate Vivipara. Sexupara. **Head and antenna dusky; thorax brownish; abdomen pale greenish yellow. Body length 2-2.25; fore wing 2.75; hind tibia .70-.85; hind tarsal II .18-.20; antenna .74-1; rostrum attaining between 1st and 2d coxae. Cilia on permanent sensoria weak. Cornicle not evident. Fore wing with media simple.**

Ovipara. **Apterous. Yellowish green; appendages pale. Body length .60; antenna .17, five-segmented, III .03, IV .03, V .04-.05+.01; hind tibia .07. Rostrum missing.**

Male. **Apterous. Darker and much smaller than female. Rostrum missing.**

Collections. On *Populus augustifolia* in pale or red-streaked podlike pseudo galls composed of folded edges of leaves. Colorado: Monte Vista, South Saint Vrain Canyon and Fort Collins. Wyoming: Laramie. Fundatrices June 25, apterous summer viviparae and alate sexuparae July 10 to 15, sexuales July 15; rare. Fundatrix, apterous fundatrigeniae and sexuparae all develop in the same gall.

Type. U.S.N.M., No. 42815. Paratypes, Colo. Agr. Exp. Sta. Collection.

Genus **Mordvilkoja** Del Guercio

Del Guercio, 1909b:11; Baker, 1920a:70; Maxson, 1923:325.

Characters. Vertex convex; frontal tubercles lacking. Antenna four-segmented in fundatrix, six-segmented in alata, unguis in fundatrigenia longer than base of VI, secondary sensoria, narrow and transverse; permanent sensoria with cilia. Cornicle hardly more than a mere ring. Cauda semilunar. Fore wing with media simple; hind wing with both media and cubitus. Sexuales apterous and without rostrum.

Living in galls; fundatrix and offspring living together.

Genotype (monotypical), *Brysocrypta vagabunda* Walsh.

Genotype *Mordvilkoja vagabunda* (Walsh)

The Poplar Vagabond Aphid

Byrsocrypta vagabunda **Walsh, 1862:306 and 1864:462.**
Pemphigus vagabunda**, Walsh and Riley, 1869:57 and 107; Oestlund, 1887:22; Jackson, 1908a:200.**
Pemphigus oestlundi **Cockerell, 1906:34.**
Mordvilkoja vagabunda**, Gillette, 1914b:67; Maxson, 1923:325; Oestlund and Hottes, 1926:75; Gillette and Palmer, 1934:220.**

Fundatrix. **Yellow-green, with head dusky; powdery; appendages pale, dusky distally. Body length 4-5; hind tibia .40-.55; antenna .53-.62; rostrum attaining 3d coxa.**

Alate Vivipara. Fundatrigenia. **Head and thorax black; abdomen green; pruinose; tufted posteriorly; appendages dusky. Body length 2.2-3; hind tibia .85-.90; antenna .85-.88; rostrum attaining between 1st and 2d coxae. Media of fore wing simple; hamuli 4-6. Hairs in both alata and aptera inconspicuous. Cornicle hardly more than a mere ring often difficult to observe. Wax glands on thorax as in *Thecabius*. *Sexupara.* Same as fundatrigenia except as follows: Unguis only .05-.07 long, sensoria 9-14 on III and rostral IV+V .13-.17.**

Ovipara. **Apterous. Body length .80; antenna .23, I .04, II .04, III+IV .03, V .03, VI .06+.03.**

Male. **Apterous. Body length .80; antenna .17, I .04, II .03, III+IV .04, V .05+.01.**

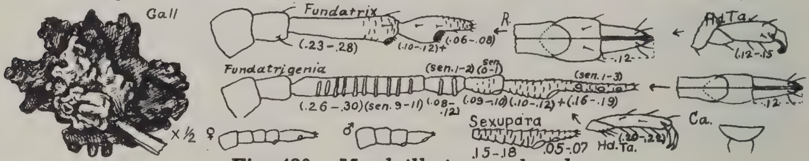

Fig. 430. *Mordvilkoja vagabunda*

Collections. In large complicated, convoluted, bladderlike leaf galls, composed of crumpled leaves of a terminal bud on *Populus sargenti*. Colorado: Hugo, Longmont, Brighton, Kuner and Fort Collins. Wyoming: Laramie. Fundatrices May 2 to July 16 (still full of embryos and apparently in their prime), alate viviparae (fundatrigeniae) July 10 to 15 (gall still containing numerous young), alate sexuparae and sexuales (dead in dry galls from a previous year) Aug. 19; rare though common and abundant at times in localities.

Genus **Pemphigus** Hartig

Hartig, 1839:645 and 1841:366; Jackson, 1908a:163; Baker, 1920a:71; Maxson, 1923: 326.

Characters. Antenna four-segmented in fundatrix, six-segmented in alata; seconary sensoria transverse. Wax gland plates developed on aptera; thoracic glands normally not evident in alata. Cornicle, a mere ring, developed in alata, at least. Cauda semilunar, bearing 2-4 hairs. Hairs inconspicuous. Rostral IV+V obtuse; V vestigial and indistinct. Fore wing with media simple; hind wing with both media and cubitus. Sexuales apterous, minute and without rostrum; ovipara laying single egg.

Living in true galls on *Populus* as winter host, many species known to go to roots or stems of herbs as summer host. Fundatrix living in same gall as progeny.

Genotype (fixed by Passerini, 1860), *Aphis bursaria* Linnaeus.

Key to Species of Pemphigus

(Based on alatae from galls unless otherwise stated.)

1. Secondary sensoria usually absent or but 1 on V and VI each 2
.... Secondary sensoria usually present (2 or more) on V and VI 4
2. Permanent sensorium on VI unusually large and containing chitinous islands (p. 364) .... *populi-transversus*
.... Permanent sensorium at base of VI not unusually large 3
3. III .12-.16 long (p. 361) .... *monophagus*
.... III .17-.23 long (p. 359) .... *balsamiferae*
4. Secondary sensoria 7 or more on VI (p. 362) .... *nortonii*
.... Secondary sensoria fewer than 7 on VI 5
5. III longer than IV+V, secondary sensoria more or less coalesced (p. 361) .... *junctisensoriatus*
.... III not longer than IV+V, sensoria not coalesced 6
6. Alata not smaller than 2, fundatrix not smaller than 3 (p. 364) .... *populi-ramulorum*
.... Alata usually smaller than 2, fundatrix smaller than 3 7
7. III distinctly longer than hind tarsal II 8
.... III not noticeably longer than hind tarsal II 9
8. In petiole galls on *Populus* (European species) (p. 360) .... *bursarius*
.... In petiole and leaf galls on *Populus sargenti* (American species) (p. 363) .... *populi-caulis*
9. In gall on upperside of leaf of *Populus angustifolia;* hind tarsus in fundatrix not longer than III (p. 365) .... *populi-venae*
.... In petiole and leaf gall on *Populus angustifolia;* hind tarsus in fundatrix longer than III (p. 363) .... *populi-globuli*

Pemphigus balsamiferae Williams

The Poplar Sugar-Beet Root Aphid (Plate VIII)

Pemphigus balsamiferae Williams, 1910:8; Davis, 1911b:4; Maxson, 1917: Mar. 17, in correspondence with Gillette; Gillette and Palmer, 1934:222; Maxson, 1948:106 and 111.

Pemphigus betae Doane (questionable identification), Gillette and Bragg, 1915a:97; Maxson and Knowlton, 1929:267; Maxson, 1916:500.

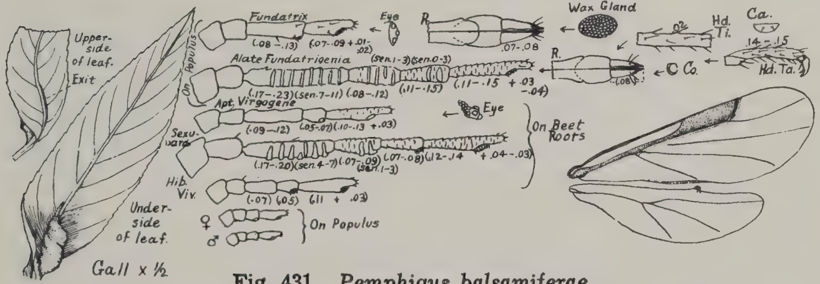

Fig. 431. *Pemphigus balsamiferae*

Fundatrix. Newly Hatched. **Light chrome-yellow to dusky greenish, with dark greenish blotch posteriorly and abdomen with 6 longitudinal rows of dusky spots; appendages blackish. Body length .54. *Adult.* Pale greenish yellow; appendages dark. Body length 2.3-2.5; hind tibia .35-.48; hind tarsal II .10-.12; antenna .26-.34; rostrum nearly attaining 2d coxa. Wax glands not evident on head, present on body.**

Alate Vivipara. Fundatrigenia **(Leaving *Populus*). Head and thorax black; abdomen dull green to yellow; powdery; appendages dusky. Body length 1.5; hind tibia .55-.77; antenna .60-.84, fore wing 2.42; hamuli 2-3 in number; rostrum hardly attaining 2d coxa. *Sexupara* (on beet roots, returning to *Populus*). Same as fundatrigenia or darker, even blue-black, and with tuft of cotton on metathorax, abdominal I and tip of abdomen and antenna usually shorter and sensoria fewer as shown in figure.**

Apterous Vivipara. Summer Form **(On beet roots). Sordid white to yellow-green; with dusky patch on head; appendages dusky. Body length 1.5-2.5; hind tibia .35-.48; hind tarsal II .10-.12; antenna .37-.46; rostrum as in fundatrix. *Hibernating Vivipara* (In soil). Body length 2; hind tibia .35-.50; hind tarsal II .11-.15; antenna .36-.50; rostral IV+V .10 attaining 2d coxa. Cornicle a mere ring.**

Ovipara. **Apterous. Pale yellowish green, somewhat dusky on head and thorax and darker posteriorly; appendages sordid whitish. Body length .81; antenna .125, four-segmented, III about same length as II; hind tibia .12.**

Male. **Apterous. Honey-yellow with head brownish; appendages sordid to dusky. Body length .562; antenna .112, four-segmented, III not longer than II; hind tibia .112.**

Egg. **Newly laid, pale sordid yellowish; later, black. Size .537 by .262.**

Collections. As winter hosts on *Populus augustifolia* and *P. tacamahaca,* in yellowish green to reddish pocketlike galls on underside with opening on upperside of leaves; as summer hosts on roots of both sugar and garden red beets *(Beta vulgaris)* and *Chenopodium album,* specimens apparently identical with this species taken on roots of *Achillea* sp., *Agropyron* sp., *Aster multiflorus, Cycloloma atriplicifolium,* head lettuce *(Lactuca sativa), Poinsettia* sp., *Polygonum aviculare,* and *Solidago* sp. Throughout region. Fundatrices on *Populus* April 23 to July 10, apterous summer viviparae on summer hosts May 6 to Nov. 26, hiberating viviparae on summer hosts throughout the winter, alate viviparae on *Populus* July 4 to 11 and Sept. 23 to Oct. 28 and on summer hosts Aug. 27 to Nov. 23, sexuales on *Populus* Sept. 28 to Oct. 4; common often injurious. Fundatrix lives in gall with alate fundatrigeniae which leave for summer hosts, alate sexuparae return from the beet to the *Populus* where they deposit the sexuales.

Cotypes. U.S.N.M., No. 121 and Univ. of Neb. Collection, No. 5.

Chief Distinguishing Characters. Character of gall produced, absence of secondary sensoria or at least not more than 3 on V and none on VI in alata, length of III (in fundatrix .08-.13, in alate vivipara .17-.23) and number of sensoria on III in alatae (4-7 in sexupara and 7-11 in fundatrigenia).

This species is very close to *P. betae* Doane (1900:391) but *betae* has not been found in galls on *Populus* in its native territory according to Swain (1919:142), Essig (1926, 1948 ed:261) and Lange (1944:735).

A. C. Maxson apparently established the poplar as the winter host for the *Pemphigus* on sugar beet in Colorado as shown by the following quotation from his correspondence with Gillette, March 17, 1917: "This I did by placing a twig (of *Populus angustifolia)* in the cage when the sexuparae were leaving the beet, secured the sexuales and later the eggs (on this twig). The twig was tied to a sterilized narrowleaf poplar seedling growing in the laboratory and the process from egg to gall making and later migrants secured which were identical to *balsamiferae* as was the gall produced."

[Genotype *Pemphigus bursarius* (Linnaeus)]

Aphis bursaria **Linnaeus, 1758:453.**
Pemphigus bursarius, **Tullgren, 1909:114; Theobald, 1929:245.**

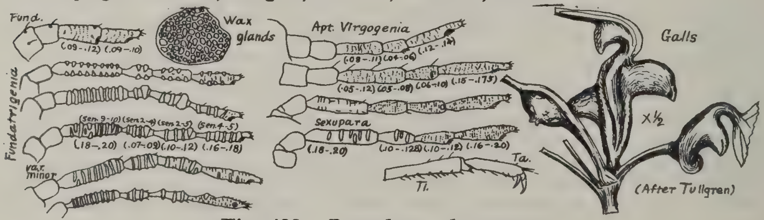

Fig. 432. *Pemphigus bursarius*

Fundatrix. **Dull green; dusky on head; mealy; appendages dusky. Body length 2-2.2; hind tibia .30-.40; hind tarsal II .12-.13; antenna .27-.34; rostrum attaining 2d coxa. Wax glands present.**

Apterous Vivipara. **Yellowish white, with lateral spots.**

Alate Vivipara. Fundatrigenia). Head and thorax dark; abdomen pale green to gray-green, with dark markings and lateral spots; mealy and flocculent. Body length 1.7-2.2; fore wing 2.5-2.6; hind tibia .50-.72; hind tarsal II .15-.18; antenna .60-.75; rostral IV+V .08, attaining 2d coxa. Wax plates present. Hairs in both forms inconspicuous.

Hosts. As winter host in petiole galls on *Populus* sp.; as summer hosts on lambsquarters *(Chenopodium* sp.*)*, carrot *(Daucus* sp.*)*, lettuce *(Lactuca* sp.*)*, *Lampsana communis* and *Sonchus* sp., on roots. (Not recorded from region.)

Data for descriptions and drawings from Tullgren (op. cit.) and from specimens determined by van der Goot.

Pemphigus junctisensoriatus Maxson

The Poplar Petiole-leaf Gall Aphid

Pemphigus junctisensoriatus Maxson, 1934:34; Gillette and Palmer, 1934:223.

Fundatrix. Pale yellowish white, brownish on head; tibiae brownish. Body length 3-4; hind tibia .52-.60; hind tarsal II .15-.16; antenna .47-.50, four-segmented; rostral IV+V .11, attaining 2d coxa. Wax gland plates typical; cornicle absent.

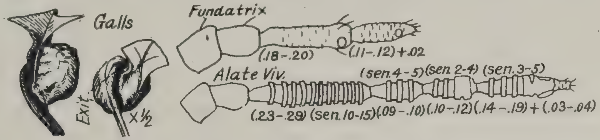
Galls
Exit
x½
Fundatrix
(.18-.20)
(.11-.12)+.02
Alate Viv.
(sen.4-5)(sen. 2-4) (sen.3-5)
(.23-.29) (sen.10-15)(.09-.10)(.10-.12)(.14-.19)+(.03-.04)

Fig. 433. *Pemphigus junctisensoriatus*

Alate Vivipara. Fundatrigenia. Head and thorax blackish; abdomen yellow-green or with bluish tinge; powdery; appendages dusky. Body length 1.4-1.8; across eyes .41; fore wing 2.5-3; hamuli 2 in number; antenna .75-.82, secondary sensoria broad and flat, prominently raised often partly or wholly anastomosed, not entirely encircling the segments; rostral IV+V .10, attaining between 1st and 2d coxae. Cornicle a mere pore.

Gall. Pale yellowish green. Composed mostly of swollen petiole; twisted on broadened leaf base; exit hole consisting of a crevice extending over halfway around between petiole and leaf.

Collections. On *Populus sargenti* in petiole and leaf galls. Colorado: Wiggins and Boulder. Fundatrices and alate viviparae (fundatrigeniae) June 8 and 29, alate viviparae and sexuparae Sept. 2; rare.

Type. U.S.N.M., No. 50063. Paratypes, Maxson Collection.

This species is peculiar in the broad and occasionally anastomosed sensoria as well as the gall which consists mostly of enlarged petiole with exit hole in the form of a long slit between petiole and leaf.

Pemphigus monophagus Maxson

Pemphigus monophagus Maxson, 1934:37; Gillette and Palmer, 1934:224.

Fundatrix. Honey-yellow to pale olive-green; brown on head; appendages brown. Body length 1.1-1.7; hind tibia .20-.33; hind tarsal II .08-.10; antenna .20-.28, four-segmented; rostrum attaining 2d coxa. Cornicle not evident. Wax plates present except on head.

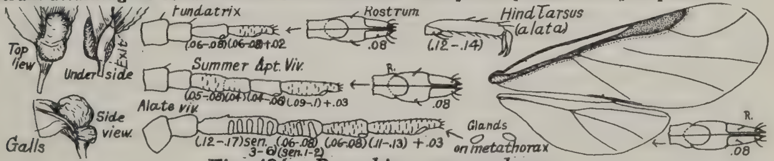

Fig. 434. *Pemphigus monophagus*

Apterous Vivipara. Whitish to creamy; brownish on head; appendages brownish. Body length 1.2-1.44; hind tibia .25; hind tarsal II .10-.11; antenna .39-.46; rostrum as in fundatrix.

Alate Vivipara. Sexupara. Head and thorax blackish; abdomen pale yellow-green; powdery; appendages dusky. Body length 1.4-1.9; hind tibia .50-.74; hind tarsal II .12-.19; antenna .48-.58; rostrum attaining between 1st and 2d coxae; fore wing 3.

Ovipara. Apterous. Body length 1.016; antenna four-jointed .155, I .026, II .026, III+IV +V (coalesced) .034 with permanent sensorium near distal end, VI .069 with permanent sensorium at base of unguis. Rostrum lacking. Tarsi well developed.

Male. Apterous. Body length .78; antenna four-segmented, .11, I .026, II .021, III+IV +V (coalesced) .017 with permanent sensorium near distal end, VI .052 with permanent sensorium at base of unguis. Legs somewhat rudimentary; tarsi shorter than the diameter of tibia, cone-shaped. Rostrum lacking.

Description of sexuales taken from original description by Maxson (op. cit.).

Gall. Pale greenish yellow. Composed mostly of swelling on upperside of leaf base with petiole broadened and somewhat twisted; orifice consisting of a slit on underside between petiole and leaf. Gall may be either globular or with more or less transverse indentation as shown in figure.

Collections. In twisted petiole and leaf galls on *Populus angustifolia* and *P. tacamahaca* (There appears to be no alternate host since the alate viviparae leaving the gall as soon as it opens are already sexuparae and must deposit the sexuales on the winter host.) Colorado: Buckhorn Creek (near Masonville), at Redfeather, Horseshoe Park (in Rocky Mountain National Park), Colorado Springs and Walden. Fundatrices July 4 to Sept. 23, apterous summer viviparae July 12 to Sept. 23, alate viviparae (sexuparae) Aug. 18 to Sept. 23, sexuales Aug. 10 (born from alatae which were imprisoned); rather rare. The fundatrix and apterous viviparae (very few) are found in the galls with alate sexuparae.

Type. U.S.N.M., No. 50065. Paratypes, Maxson Collection.

This species is peculiar in the presence of a few apterous fundatrigeniae in the gall before the appearance of alatae and in the small size of both fundatrix and apterous fundatrigeniae. Whether the alatae are produced by the fundatrix or by the apterous fundatrigeniae or by both is not known. It is peculiar also in the development of sexuparae, apparently the only alate generation, in the same gall with the fundatrix, which situation indicates the lack of an alternate host.

Pemphigus nortonii Maxson

Pemphigus nortoni Maxson, 1934:36; Gillette and Palmer, 1934:225.

Fundatrix. (Mounted in balsam), pale with appendages pale brown. Body length 2.5-2.6; across eyes .45; hind tibia .47-.50; hind tarsal II .14; antenna .35-.40; rostral IV+V .10, attaining 2d coxa. Wax glands well developed, present on thorax and abdomen, each surrounded by a distinct chitinous ring.

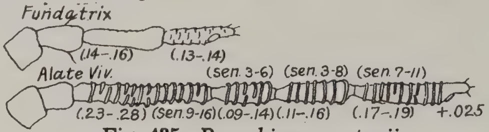

Fig. 435. *Pemphigus nortonii*

Alate Vivipara. Fundatrigenia. Head and thorax blackish; abdomen yellow-green to bluish; powdery; appendages dusky. Body length 1.53-1.84; fore wing 2.3; hamuli 2 in number; hind tibia .60-.73; hind tarsal II .16-.17; antenna .80-.83; rostral IV+V .09, attaining 1st and 2d coxae.

Gall. Pale yellowish green. In swollen leaf base twisted on flattened and broadened petiole base; exit hole small, round orifice on underside between leaf and petiole. Size 20 mm in diameter.

Collections. On *Populus sargenti* in twisted petiole and leaf galls, indistinguishable from galls of *P. populi-caulis.* Colorado: Longmont, Dent and Fort Collins. Wyoming: Wheatland. Fundatrices and alate viviparae (fundatrigeniae) July 2 to Sept. 21; not very common.

Type. U.S.N.M., No. 50064. Paratypes, Maxson Collection.

Chief Distinguishing Characters. Character of gall (composed largely of enlarged leaf and with exit hole, a small round opening on underside between leaf and petiole), length of antenna (about half body length in alate vivipara and slightly exceeding twice distance across eyes and III not shorter than .23, in fundatrix III not shorter than .14) and number of secondary sensoria on VI (at least 7).

Pemphigus populi-caulis Fitch

Poplar Leaf-petiole Gall Aphid

Pemphigus populicaulis Fitch, 1859:845; Thomas, 1879:149; Jackson, 1908a:191; Davidson, 1915:420; Maxson and Knowlton, 1929:254; Gillette and Palmer, 1934:226.

Fundatrix. Pale yellowish to creamy; pruinose; appendages slightly dusky. Body length 2-2.9; hind tibia .35-.40; hind tarsal II .12; antenna .30-.36; rostrum attaining between 1st and 2d coxae. Wax glands in 6 dorsal rows; none on head.

Alate Vivipara. Blackish brown on head and thorax; abdomen yellowish olive-green; appendages dusky brown. Body length 1.7-2; across eyes .33-.38; fore wing 2.6-3; hamuli 2-3; hind tibia .50-.70; antenna .66-.76; rostrum attaining between 1st and 2d coxae.

Gall. Yellowish green to creamy, formed of swollen base of leaf twisted with broadened petiole; exit a small round hole on underside between leaf and petiole. Size 10-13 mm in diameter.

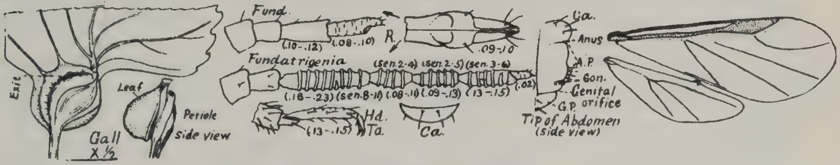

Fig. 436. *Pemphigus populi-caulis*

Cellections. As winter host on *Populus sargenti* and rarely *P. acuminata,* in twisted petiole and leaf galls; alternate host unknown.
Throughout Colorado and nothern Utah. Fundatrices June 12 to Aug. 29, alate fundatrigeniae June 20 to Aug. 29; common.

Chief Distinguishing Characters. Character of gall with round exit hole, length of antenna (III not longer than .12 in fundatrix, not exceeding .23 in alata), number of sensoria on antenna especially on VI (on latter less than 7).

This species is very close to *P. bursarius* (Linnaeus) and distinguished most certainly by form of gall. However, a number of collections of specimens apparently inseparable from *P. populicaulis* have been taken in petiole galls resembling those of *P. populi-transversus.* Galls of *P. bursarius* according to Tullgren (1909:114) and Theobald (1929:245) differ in more protruding lips. The question of the status of these forms requires further biological work.

Pemphigus populi-globuli Fitch

The Poplar Bullet Gall Aphid

Pemphigus populi-globuli Fitch, 1859:850; Thomas, 1879:153; Jackson, 1908a:196; Maxson and Knowlton, 1929:254 and 261; Gillette and Palmer, 1934:226.

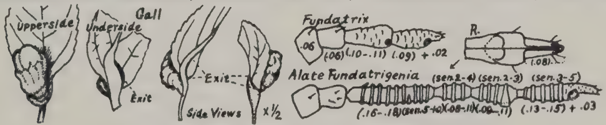

Fig. 437. *Pemphigus populi-globuli*

Fundatrix. Wax glands present on entire body. Dark green; head, rostrum and appendages dusky. Body length 1.7-2; hind tibia .38-.45; hind tarsal II .13-.14; antenna .33.

Alate Vivipara. Head and thorax blackish; abdomen greenish to blackish; slightly flocculent; rostrum, cauda, anal plate, genital plate and appendages blackish. Body length 1.5-1.6; hind tibia .55-.70; hind tarsal II .15-.17; antenna .50-.55; fore wing 2.5-3; hamuli 2-3 in number. Rostrum attaining 2d coxa.

Gall. Pale yellow or red. Composed mostly of swollen leaf base and flat but broadened petiole; exit hole a slit on underside between leaf and petiole.

Collections. As winter host in petiole and leaf gall on *Populus angustifolia* and *P. "balsamifera (?)"* (probably *P. candicans* or *deltoides* since the localities recorded are out of the habitat range of *P. tacamahaca*). Utah: Throughout northern part of state. Colorado: Buckhorn Creek near Masonville), Longmont and Monte Vista. Fundatrices June 24 to July 4, alate fundatrigeniae July 4 and (dead specimens in gall) Aug. 18; rare.

This species is very close to *P. populi-caulis* and only doubtfully separated by host, shape of gall which is without definite round exit hole and length of III in fundatrigenia (not distinctly longer than hind tarsal II, longer than hind tarsal II in *P. populi-caulis*).

Pemphigus populi-ramulorum Riley

The Poplar Twig-gall Aphid

Pemphigus populi-ramulorum Riley, 1879:16; Thomas, 1879:209; Jackson, 1908a:208; Gillette and Palmer, 1934:227.

Fundatrix. Pale creamy yellow; appendages dusky. Body length 2.5-3; hind tibia .40-.50; hind tarsal II .13; antenna .32-.37; rostrum rarely attaining 2d coxa. Gland plates on dorsum in 6 longitudinal rows.

Alate Vivipara. Fundatrigenia. Head and thorax black; abdomen dark olive; appendages dusky. Body length 2.25; fore wing 3-3.5, hamuli 2 in number; hind tibia .60-.70; hind tarsal II .15; antenna .61-.68. Cornicle plainly evident. Rostrum attaining between 1st and 2d coxae.

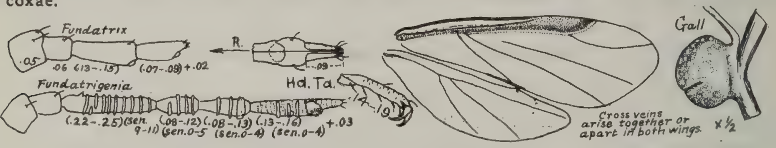
Fundatrix
.05
.06 (.13-.15) (.07-.09)+.02
R.
.09
Fundatrigenia
Hd. Ta.
.14-.19
(.22-.25)(sen. 9-11) (.08-.12)(sen. 0-5 (.08-.13) (sen. 0-4) (.13-.16) (sen. 0-4) +.03
Cross veins arise together or apart in both wings
Gall
x½

Fig. 438. *Pemphigus populi-ramulorum*

Gall. Green. Normally globular with transverse mouth, about 25 mm in diameter. In cases of heavy infestation some galls are elongated and some occur on petioles where they differ from galls of *P. populi-transversus* by protruding upper lip. Normally located on stem of twig at base of petiole.

Collections. As winter host on *Populus sargenti* and *P. "balsamifera"* (probably *P. candicans* or *deltoides*), in twig and sometimes petiole galls; summer host unknown. Throughout region. Fundatrices June 8 to July 22, alate fundatrigeniae June 8 to Aug. 14; rather common.

Chief Distinguishing Characters. Character of gall, presence of secondary sensoria on all antennal segments, but fewer than 7 on IV, length of III (.22-.25 in fundatrigenia, about .14 in fundatrix).

Pemphigus populi-transversus Riley

The Poplar Leaf-stem Gall Aphid

Pemphigus populi-transversus Riley, 1879:15; Thomas, 1879:208; Oestlund, 1887:21; Jackson, 1908a:206; Jones and Gillette, 1918:577 (life history); Gillette and Palmer, 1934:228.

Fundatrix. Whitish to pale sordid greenish yellow; powdery; black on head, rostrum and appendages. Body length 2.6-3; hind tibia .45-.55; hind tarsal II .13-.15; antenna .36.

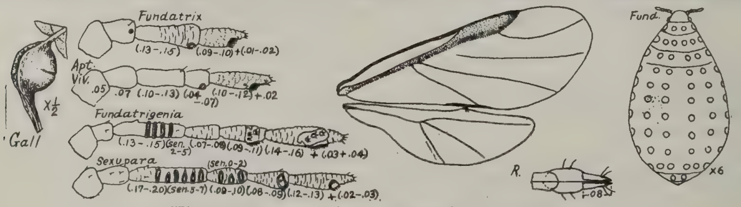

Fig. 439. *Pemphigus populi-transversus*

Alate Vivipara. Fundatrigenia. Head and thorax black; abdomen sordid pale greenish yellow; rostrum and appendages blackish. Body length 1.7-2; wing 2.9-3; hamuli 2-3 in number; hind tibia .50-.65; hind tarsal II .15-.17; antenna .53-.63. *Sexupara.* Same as fundatrigenia excepting antenna which is slightly longer.

Apterous Summer Vivipara. Same as fundatrix excepting antenna which is as figured, body length 2-2.5, wax glands which are not evident and rostrum attaining between 1st and 2d coxae.

Ovipara. Apterous. Buttercup-yellow with head and appendages whitish and transparent. Body length .70-.90; antenna .15, four-segmented, segments about equal in length, I and II longest.

Male. Apterous. Pale yellowish green. Body length .60-.65. Legs very stout.

Egg. Newly laid, dull white to yellow, glistening; later, black. Size .48-.57 by .19-.24.

Gall. Same color as petiole but often with reddish tinge. Size, usually 12-18 mm in diameter, occasionally 25.

Collections. As winter host on *Populus sargenti* in petiole galls, as summer host on cruciferous plants (in Louisiana, not recorded on summer hosts in this region, but to be expected); Colorado: throughout state. Utah: Farmington and Santa Clara. Fundatrices June 8 to Aug. 29, alate fundatrigeniae June 12 to August 31; not abundant.

Chief Distinguishing Characters. Petiole gall with transverse mouth and large permanent sensorium containing chitinous islands on base of VI.

Sexupara and ovipara described and figured from Louisiana specimens sent by T. H. Jones.

Pemphigus populi-venae Fitch

The Poplar-vein Gall Aphid

Pemphigus populi-venae Fitch, 1859:851; Thomas, 1879:154; Jackson, 1908a:194; Maxson and Knowlton, 1929:264; Gillette and Palmer, 1934:228.

Fundatrix. Head black, abdomen pale with greenish tinge; appendages and rostrum brown. Body length 2; hind tibia .35-.40; hind tarsal II .10; antenna .30-.34.

Alate Vivipara. Fundatrigenia. Head and thorax black; abdomen greenish; rostrum and appendages brown. Body length 1.1-1.8; fore wing 2.8; hamuli usually 2-3 but occasionally 4 in number; hind tibia .60-.75; hind tarsal II .15-.19; antenna .60-.80. Rostrum attaining nearly to 2d coxa.

Gall. Greenish or yellowish, sometimes with blush of red. Pocketlike excrescence varying from oblong to semicircular on upperside of leaf with slitlike mouth on underside next to midrib, similar to that of *P. balsamiferae* but on opposite surface of leaf.

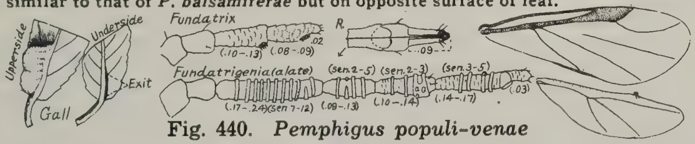

Fig. 440. *Pemphigus populi-venae*

Collections. As winter host on *Populus angustifolia,* in pocketlike leaf galls. Colorado: Masonville, Boulder, Longmont and Fort Collins. Utah: Hyrum. Fundatrices May 18 to July 4, alate fundatrigeniae June 11 to July 12; rare.

This species is doubtfully separated from *P. populi-globuli* except by the character of the gall, located on leaf blade, not involving petiole.

Species Not Included in Key.

Not included on account of lack of alate viviparae and unavailability of type specimens. (Known only from the original description.)

Pemphigus lasii (Cockerell) n. comb.

Tychea lasii Cockerell (W. P.), 1903:217.

"Apterous Female" (presumably viviparous). Smooth, shining, greenish yellow with sutures inconspicuous, head broad and subtruncate, eye not on tubercle; legs and tip of rostrum dark brown; cauda light brown. Body length 2; antennal segments as follows: I .06, II .09, III .099, IV .036, V .115+.03, sensoria on antennal IV and V large and conspicuous. Hairs not evident on body or appendages.

Collections. In ants' nest with *Lasius americanus.* New Mexico: Las Vegas; as recorded by Mrs. W. P. Cockerell. (Data for above description taken from original description.)

This form is probably the summer form of a species of *Pemphigus* at present known only from the primary host.

Genus **Prociphilus** Koch

Koch, 1856:279; Tullgren, 1909:74; Baker, 1920a:76.

Characters. Antenna five-segmented in fundatrix, five or six-segmented in summer aptera, six-segmented in alata. Wax glands well developed on head of fundatrix; thoracic glands in alata large and not farther apart than their diameter. Cornicle absent. Cauda semilunar, bearing 4 to numerous hairs. Hairs inconspicuous, short and sparse, to somewhat conspicuous, about as long as diameter of segment bearing them and numerous. Fore wing with media simple; hind wing with both media and cubitus. Living in pseudo galls in leaves (excepting *P. venafuscus* on bark).

Genotype (fixed by Gerstaecker, 1859), *Aphis bumeliae* Schrank.

Key to Species of Prociphilus

(Based on alatae from pseudo galls unless otherwise stated.)

1. III longer than .60 (p. 366) .... *bumeliae*
.... III shorter than .60 2
2. Secondary sensoria on III fewer than 10 (p. 368) .... *fraxinifoliae*
.... Secondary sensoria on III more than 10 3
3. Hairs numerous on hind tibia and longer than diameter of tibia. (On bark.) (p. 368) .... *venafuscus*
.... Hairs on hind tibia sparse and shorter than diameter of tibia 4
4. Hind tarsal II coequal with rostral IV+V. (On roots.) (p. 367) .... *erigeronensis*
.... Hind tarsal II distinctly longer than rostral IV+V 5
5. Hind tarsal II about .20 long; secondary sensoria 0 to 4 on V (p. 366) .... *corrugatans*
.... Hind tarsal II about .30 long; secondary sensoria 0-1 on V (p. 369) .... *xylostei*

[Genotype *Prociphilus bumeliae* (Schrank)]

Aphis bumeliae **Schrank, 1801:102.**
Prociphilus bumeliae**, Theobald, 1929:226; Tullgren, 1909:76.**

Fundatrix. **Head and prothorax blackish brown; abdomen yellow-brown; mealy with white tufts; appendages dark to black. Body length 4; hind tibia .91; hind tarsal II .24; antenna 1-1.2.**

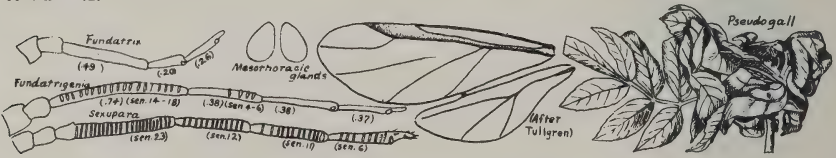

Fig. 441. *Prociphilus bumeliae*

Alate Vivipara. Fundatrigenia. **Head and thorax dark brown to blackish; abdomen dull yellow-red to ochre-brown; mealy to woolly; appendages dark brown to black. Body length 4; fore wing 5.5; hind tibia 1.5-1.6; antenna 2.07-2.2; rostral IV+V .22, nearly attaining 2d coxa. Wax gland plates present on head, one pair of small ones between antennae and a pair of large ones on occiput between eyes; on pronotum two pairs, the median pair very large and nearly coalescing; on mesothorax a pair of large plates close together.**

Host. As winter host *Fraxinus excelsior* in pseudo gall leaf galls; as summer host on roots of *Abies balsamea* and *Pinus* sp. (Not recorded on latter hosts from region.)

Data for above description and drawings taken from description and figures by Tullgren.

Prociphilus corrugatans (Sirrine)

The Woolly Hawthorn Aphid

Pemphigus corrugatans **Sirrine, 1893:129.**
Prociphilus alnifoliae **Williams, 1910:7; Davis, 1911b:4.**
Prociphilus corugatans**, Maxson, 1923:322 (synonymy declared); Gillette and Palmer, 1934:230.**

Fundatrix. **Light greenish yellow, black on head; woolly; appendages black. Body length 3.5; hind tibia .55-.63; hind tarsal II .15; antenna .63-.70; eye on tubercle.**

Alate Vivipara. Head and thorax dark; abdomen olive-green; woolly; appendages dark. Body length 2-2.8; fore wing 3.3-4.2; hamuli 3-4 in number; hind tibia .75-.95; hind tarsal II .20; antenna .85-.90; rostral IV+V .10, attaining 2d coxa. Hairs minute and sparse.

Pseudo Gall. Loosely rolled leaves.

Collections. As winter host in slightly rolled leaves of *Crataegus* sp. and *Amelanchier alnifolia,* summer host unknown. Colorado: Paonia, Boulder, Loveland, Bellvue, Poudre Canyon and Fort Collins. Idaho: Rexburg. Fundatrices April 19 to June 6, alate fundatrigeniae May 29 to June 23; infestations heavy but rare.

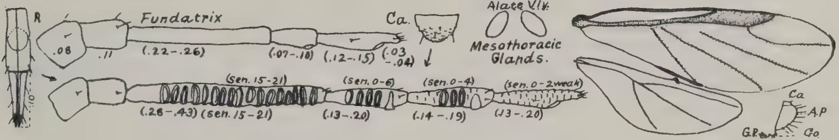

Fig. 442. *Prociphilus corrugatans*

Our specimens differ from Sirrine's description in that the fundatrix has a five-segmented antenna instead of six-segmented as described by Sirrine (perhaps erroneously since subsequent workers have apparently failed to take apterae of what is considered to be this species with more than five-segmented antenna) and in not having 6-12 sensoria on IV in alata. Our specimens agree with *P. alnifoliae* Williams excepting that body length of alate vivipara is not 3.54. Maxson's studies (op. cit.) place Williams species as a synonym of *P. corrugatans* Sirrine.

Chief Distinguishing Characters. Woolly secretion not in two filaments, secondary sensoria on antenna oval and transverse, length of rostral IV+V (about half as long as hind tarsal II) and leaf deformation (only loosely curled).

Prociphilus erigeronensis (Thomas)

The White Aster Root Aphid

Tychea erigeronensis Thomas, 1879:168.
Trama erigeronensis, Forbes and Hart, 1894:93.
Forda flavula Rohwer, 1908:68 (new synonymy).
Prociphilus erigeronensis, Patch, 1918:46; Cutright, 1925:207; Gillette and Palmer, 1934:231; Braidwell, 1942:129 (description of fundatrix).

Apterous Summer Vivipara. Head brownish; body yellow-buff; woolly; cauda, protruding anal plate and appendages blackish. Body length 2-3; hind tibia .35-.45; antenna .50-.55. Wax glands in longitudinal rows on dorsum of body, on head one pair on vertex, another pair posterior to vertex and 4 single ones along posterior edge of head.

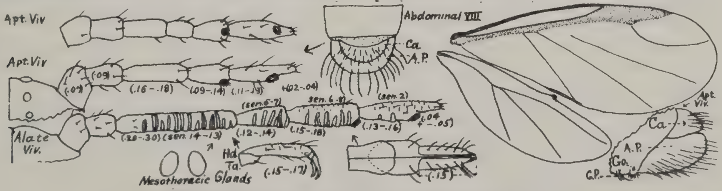

Fig. 443. *Prociphilus erigeronensis*

Alate Vivipara. Olive-yellow on abdomen, brown on head and thorax; woolly; appendages blackish. Body length 2.2; fore wing 2.5; hamuli 3-4 in number; hind tibia .55-.60; antenna .80. Rostrum attaining abdominal I or II. Lateral tubercles present on prothorax and some of anterior abdominal segments. Hairs on III and hind tibia sparse, shorter than diameter of segment bearing them.

Young. Newborn, almost milky white.

Collections. Winter host unknown; summer host, roots of grasses, *Artemisia* sp., *Grindelia squarrosa*, *Helianthus* sp., *Taraxacum officinale* and ants' nests.

Colorado: Greeley and Fort Collins. Apterous viviparae March 30 to Nov. 2, alate viviparae June 21; rather rare.

Cotypes. Ill. Nat. Hist. Surv. Collection.

Chief Distinguishing Characters. Protruding cauda and anal plate, moderately long rostral IV+V (.15, barely as long as hind tarsal II), length of III (not exceeding .30), number of sensoria on III in alate vivipara (13-14).

Prociphilus fraxinifolii (Riley)

The Leaf-curl Ash Aphid

Pemphigus fraxinifolii Riley, 1879:17; Thomas, 1879:146 and 210.
Prociphilus fraxinifolii, Jackson, 1908:211; Maxson and Knowlton, 1929:270; Gillette and Palmer, 1934:232.

Fundatrix. Medium yellow-green to pale yellow; brown on head; flocculent; appendages brown. Body length 2-2.5; hind tibia .40-.55; hind tarsal II .14-.16; antenna .50-.60; rostrum attaining 2d coxa. Large wax glands present on head, 3 longitudinal rows on body.

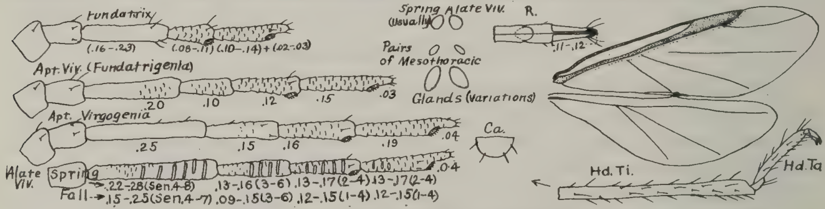

Fig. 444. *Prociphilus fraxinifolii*

Apterous Vivipara. Body length 2.5; hind tibia .55-.70; antenna .80.

Alate Vivipara. Fundatrigenia. Brown on head and thorax, yellow-green on abdomen; flocculent; appendages slightly dusky to black. Body length 2; fore wing 2.5; hamuli 2-3 in number; hind tibia .60-.76; antenna .80-.96; rostrum hardly attaining 2d coxa. Wax glands present on head, small, arranged in 2 longitudinal rows of 3, a pair varying in size on mesothorax.

Pseudo gall. Loosely to tightly rolled and curled leaves forming a mass on tips of twigs.

Collections. As winter host, in curled leaves of *Fraxinus americana.* Throughout region. Fundatrices May 5 to 25, apterous viviparae May 25 to Sept. 29, alate viviparae July 13 to Sept. 10; very common.

Type. Possibly U.S.N.M. Lectotype and paratypes, Ill. Nat. Hist. Surv. No. 2762 and 7167.

Chief Distinguishing Characters. Character of the pseudo gall (the rather tightly curled leaves), number of sensoria on III of alate vivipara (fewer than 10), length of III in alate vivipara (not greater than .30), length of rostral IV+V (.11-.12), and hyaline wings.

Prociphilus venafuscus (Patch)

The Smoky-winged Ash Aphid

Pemphigus venafuscus Patch, 1909:319.
Prociphilus venafuscus. Patch, 1918:45; Gillette and Palmer, 1934:232.

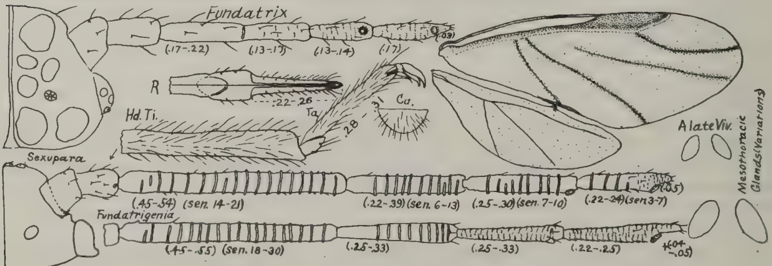

Fig. 445. *Prociphilus venafuscus*

Fundatrix. Medium brown; flocculent; rostrum and appendages dark. Body length 2.5-4.5; hind tibia .70-.80; hind tarsal II .20; antenna .80-1; rostrum attaining 2d coxa.

Alate Vivipara. Dark brown; flocculent; rostrum and appendages dark; wings slightly smoky. Body length 3; hind tibia 1.20-1.40; antenna 1.36-1.63; rostrum attaining abdominal II. Hairs on hind tibia numerous, .05, about as long as diameter of tibia. Wings slightly smoky, veins narrowly bordered.

Apterous Summer Vivipara. About the same as fundatrix.

Ovipara. Apterous. Golden yellow to brownish, lighter on head; appendages pale. Body length 1-1.33; antenna .26-.30, five-segmented, segments all about same length except VI slightly longer by length of unguis; hind tibia .16.

Male. Apterous. Pale dusky green, lighter anteriorly; appendages pale. Body length .82; antenna .30, five-segmented; hind tibia .16.

Collections. As winter host *Fraxinus pennsylvanica, Syringa** and *Forsythia** on bark of twigs; summer host roots of *Abies balsamea**. Colorado: Fort Collins. Fundatrices May 13 to 31, apterous summer viviparae May 15, alate viviparae May 26 to June 24 and Sept. 6 to Nov. 13, males Oct. 10 to 17; not common.

Chief Distinguishing Characters. Long antenna (1.36-1.63), small mesothoracic glands in alata, very slightly smoky wings, habit of a bark feeder, long hind tarsal II (.25-.31) and long rostral IV+V (.22-.26).

Procriphilus xylostei (De Geer)

The Woolly Honeysuckle Aphid

Aphis xylostei De Geer, 1773:96.
Prociphilus xylostei, Tullgren, 1909:83; Mordvilko, 1935:92.

Alate Vivipara. Fundatrigenia. Head and thorax black; abdomen yellow; woolly. Body length 2-2.8; across eyes .40-.45; antenna 1.10-1.40; hind tibia 1-1.40. One pair of small wax glands on posterior margin of head and a large pair on mesothorax.

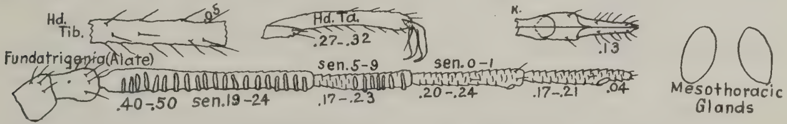

Fig. 446. *Prociphilus xylostei*

Collections. On underside of partly curled leaves of *Lonicera involucrata*. Colorado: Gould (near Cameron Pass). Alate viviparae Aug. 20; rare.

Chief Distinguishing Characters. Habit of living in pseudo gall of partially curled leaves, length of antenna (III .40-.50), number of secondary sensoria on III (19-24) and on IV (5-9) and their absence on V and VI, length of rostral IV+V (.13), length of hind tarsal II (.27-.30) and rather long fine tibial hairs (.05, about as long as diameter of tibia).

Genus **Thecabius** Koch

Koch, 1856:294; Baker, 1920a:77; Maxson, 1923:324; Theobald, 1929:220.

Characters. Antenna five-segmented in fundatrix, six-segmented in alata. Wax glands small on head of fundatrix; mesothoracic glands in alata with diameter much less than distance between them. Cornicle absent. Cauda semilunar, bearing 2-4 hairs. Hairs inconspicuous. Fore wing with media simple; hind wing with both media and cubitus. Living in pseudo galls (except *populimonilis* in true galls); fundatrix usually in a gall by herself (except *patchii* Gillette).

Genotype (monotypical), *Thecabius populneus* Koch (synonym of *Pemphigus affinis* Kaltenbach).

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*According to Patch (1918:45) and Maxson (1923:323). Not taken on these hosts in this region.

Key to Species of Thecabius

(Based on alate viviparae from galls or pseudo galls)

1.	**VI with secondary sensoria in fundatrigenia**	**2**
....	**VI without secondary sensoria in fundatrigenia**	**3**
2.	**In America. Alate fundatrigenia with 5-8 secondary sensoria on VI. (p. 370)**	***populi-conduplifolius***
....	**In Europe. Alate fundatrigenia with 3-4 secondary sensoria on VI. (p. 370)**	***affinis***
3.	**Sensoria on III more than 10 (p. 370)**	***gravicornis***
....	**Sensoria on III fewer than 10 (p. 371)**	***populi-monilis***

[Genotype *Thecabius affinis* (Kaltenbach)]

Pemphigus affinis **Kaltenbach, 1843:182.**
Thecabius affinis**, Tullgren, 1909:103; Mordvilko, 1935:62.**

Characters. Similar to *T. populi-conduplifolius;* apparently differing only by character given in key. (Decision based on description by Tullgren and specimens determined by van der Goot and Hille Ris Lambers.) (Not taken in region.)

Thecabius gravicornis (Patch)

The Folded-leaf Balsam Aphid

Pemphigus gravicornis **Patch, 1913:75.**
Thecabius gravicornis**, Maxson, 1923:325; Gillette and Palmer, 1934:234.**

Fundatrix. **Head and pronotum dark; rest of body pale honey-yellow; appendages and rostrum dark. Body length 2; antenna .52.**

Alate Fundatrigenia. **Head and thorax brown; abdomen olive-yellow; appendages and rostrum brownish to black. Body length 1.7-2.8; fore wing 3-3.5; hamuli 2 in number; hind tibia .75-.85; hind tarsal II .23; antenna 1.05-1.27, secondary sensoria very broad and often more or less annular. Rostrum attaining 2d coxa.**

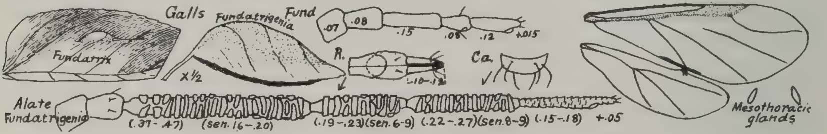

Fig. 447. *Thecabius gravicornis*

Pseudo Galls. **Fundatrix in small pocketlike swelling on upperside of leaf about halfway between midrib and edge of leaf, opening on under side; progeny on underside of leaves which are folded downwards together on midrib.**

Collections. As winter host on *Populus tacamahaca,* in folded leaf pseudo galls. Colorado: Pennock Pass (above Masonville), Steamboat Springs and at Red Feather. Fundatrices Aug. 24, alate fundatrigeniae Aug. 18 and 24; rare, perhaps on account of rarity of host.

Chief Distinguishing Characters. Unusually broad, transverse, approximately annular secondary sensoria, character of the pseudo galls, absence of sensoria on VI and short antenna of fundatrix (III not longer than about .15).

Thecabius populi-conduplifolius (Cowen)

The Folded Leaf Poplar Aphid

Pemphigus populi-conduplifolius **Cowen (in Gillette and Baker), 1895:115; Jackson, 1908:217.**
Pemphigus ranunculi **Davidson (W. M.), 1910:372.**
Pemphigus californicus **Davidson (W. M.), 1910:374 and 1911b:414; Essig, 1912a:699 and 700.**
Thecabius populi-conduplifolius**, Gillette, 1914b:61 and 1915a:99; Maxson and Knowlton, 1929:252; Gillette and Palmer, 1934:234; Mordvilko, 1935:68.**

Fundatrix. **Slaty-gray to yellow-olive-green, black on head; powdery with lateral and terminal threads; rostrum and appendages blackish. Wax plates on head, 3 pairs dorsal and one pair ventral, largest pair on posterior portion; on pronotum a row of 4 large ones near posterior margin and anterior to these a median pair of smaller ones, one or both of which may unite with the larger ones, leaving a total of either 4 or 5 on this segment; remainder of body with 6 longitudinal rows to abdominal VII where the number becomes 4 again. Body length 3.75-4.25; hind tibia .55-.80; hind tarsal II .17-.20; antenna .70-.80; rostrum attaining 2d coxa.**

Alate Fundatrigenia. Head and thorax black; abdomen deep green to black; powdery; rostrum and appendages black. Body length 1.8-2.5; hind tibia .80-1.1; hind tarsal II .20-.25; antenna 1.03-1.15; fore wing 3-3.3; hamuli 4 in number; rostrum attaining between 1st and 2d coxae. Wax plates as follows: one small pair on posterior dorsal portion of head and an elongate vestigial pair on edge of mesothoracic lobes.

Hibernating Apterous Vivipara. (On *Ranunculus* sp.) Body length 2.1-2.3; hind tibia .55-.80; hind tarsal II .20-.25; antenna .91-1.14.

Spring Apterous Vivipara (on *Ranunculus* sp.). Body length 1.8-2; hind tibia .50; hind tarsal II .17-.19; antenna .63-.72.

Alate Sexupara (on *Ranunculus*). Body length 2.1-2.3; fore wing 3.1-3.6 otherwise as in alate fundatrigenia except antenna as figured.

Pseudo Galls. Fundatrix solitary in leaf margin folded on underside; progeny living in colonies on underside of younger leaves folded under on midrib.

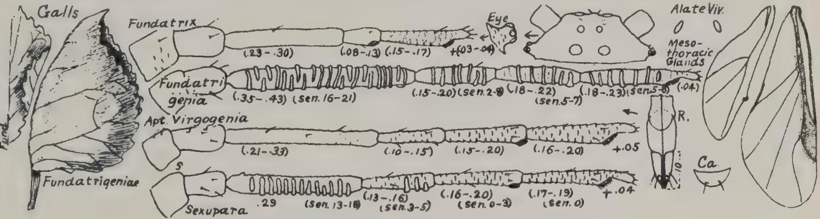

Fig. 448. *Thecabius populi-conduplifolius*

Collections. As winter host, in folded leaves of *Populus "balsamifera"* (probably *P. candicans* or *P. deltoides)* and *P. sargenti* as summer host on leaf bases of *Ranunculus* sp. Wyoming: Wheatland. Throughout Colorado and Utah. Fundatrices June 2 to 25, alate fundatrigeniae June 12 to Aug. 7 and alate sexuparae Sept. 21, apterous viviparae on *Ranunculus* Jan. 2 to April 23, alate viviparae Sept. 13 to Oct. 4; rather common.

Type. Lost. *P. ranunculi* Davidson and *californicus* Davidson, possibly in U.S.N.M.

Chief Distinguishing Characters. Folded leaf pseudo gall, rather weak narrow-transverse but not annulated sensoria and presence of 5 or more secondary sensoria on VI of fundatrigenia.

This species is very close to *T. affinis* and is indeed considered inseparable by Mordvilko (op. cit.). However, Mordvilko's description disagrees with descriptions and specimens by Tullgren, van der Goot and Theobald in the same way that the Colorado specimens differ, namely, No. 3 given above.

Special acknowledgements are due to Maxson, who cooperated in giving information acquired in experimental transfers from *Populus* to *Ranunculus* and to Davis (the latter loaned a specimen of *T. affinis* received from Tullgren).

Thecabius populi-monilis (Riley)

Beadlike Cottonwood Gall Aphid

Pemphigus populi-monilis Riley, 1879:13.
Thecabius populi-monilis, Gillette, 1913:845; Gillette and Palmer, 1934:235.

Fundatrix. Dull yellowish olive-green, dark brown on head; powdery, giving appearance of slaty-gray; head, rostrum and appendages blackish. Body 3.50 by 2.25; antenna .52; hind tibia .45; hind tarsal II .13-.15. Wax gland plates evident, when cleared and mounted, 4 on head (not apparent in all cases) and 6 longitudinal rows on body.

Apterous Fundatrigenia. Light cinnamon; head, rostrum and appendages dusky. Body 3 by 1.9; hind tibia .45-.50; hind tarsal II .13-.15; antenna .60.

Late Apterous Virgogenia. Head slightly dusky, body orange-yellow; appendages yellow to slightly dusky. Body length 1.8; hind tibia .35-.38; hind tarsal II .10-.13; antenna .38.

Alate Fundatrigenia. (Mounted in balsam), head, thorax, appendages dusky; posterior edge of stigma often darker. Body length 2.75-3; hind tibia .85-1; antenna .85-.90; fore wing 4-5; hamuli 2-5 in number. Rostrum attaining between 1st and 2d coxae. Wax gland plates not apparent in specimens cleared and mounted in balsam.

Alate Sexupara. Body length 1.75-2; hind tibia .65-.70; hind tarsal II .15-.16; antenna .60-.65; fore wing 2.6-3.

Ovipara. Apterous. Body greenish; appendages pale yellowish. Body length .90; antenna .20; hind tibia .13; hind tarsal II .06. Rostrum wanting.

Male. Apterous. Pale yellow. Body length .60. Without rostrum.

Gall. Pale green. The fundatrix gall containing a solitary fundatrix consists of a pocketlike gall on upperside of a leaf at the base of the new growth, gall opening on underside, her young migrating soon after birth and locating separately near the margins on the underside of new leaves, forming a row of pocketlike or beadlike galls each 6-10 in diameter, each containing a solitary aphid, apterous or alate. The alatae migrate, probably to another tree. The apterae produce alate virgogeniae, which form new galls, and in August and September, alate sexuparae which develop in the gall with the mother. The sexuales are certainly deposited on the *Populus*, some were found in the galls in October; but certainly not all are deposited in the galls since the sexuparae are alate and are found leaving the galls as early as August 9.

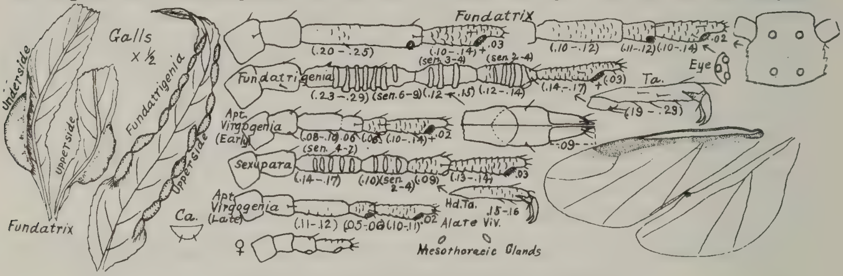

Fig. 449. *Thecabius populi-monilis*

Collections. On *Populus angustifolia* and *P. tamacahaca,* rarely on *P. sargenti,* in galls on leaves (apparently no alternate host existing). Throughout region. Fundatrices June 25, apterous and alate fundatrigeniae July 17 to Oct. 18, alate sexuparae Aug. 9 to Oct. 18, sexuales Oct. 18; rather common.

Chief Distinguishing Characters. Character of the galls, number of sensoria on III (not exceeding 10) and absence of sensoria on VI in alate vivipara and vestigial condition or absence of the wax gland plates in alate vivipara.

Tribe **Fordini** Baker

Baker, 1920a:77.

Characters. Antenna five- or six-segmented in alata. Eye of aptera consisting of ocular tubercle only. Secondary sensoria oval. Wax glands present but not well developed. Cornicle absent. Hairs rather prominent to inconspicuous. Fore wing with media simple; hind wing with both media and cubitus. Living subterranean, on roots or in the nests of ants.

Key to Genera of Fordini

1. Antenna of both alata and aptera five-segmented (p. 372)........*Forda*
.... Antenna of alata six-segmented, aptera four- to five-segmented........ 2
2. II not longer than I; permanent sensoria with cilia (p. 374)........*Geoica*
.... II longer than I; permanent sensoria without cilia (p. 375)........*Trifidaphis*

Genus **Forda** Heyden

Heyden, 1937:291; Baker, 1920a:78.

Characters. Antenna five-segmented in apterous and alate viviparae; permanent sensoria without cilia. Cauda bearing many hairs. Cornicle absent. Hairs simple. Living subterranean.

Genotype (monotypical), *Forda formicaria* Heyden.

Key to Species of Forda

1. Hairs on antenna numerous, .04-.05 long, over half as long as diameter of antenna; sensoria 30-55 on III in alate vivipara (p. 373)........*formicaria*
.... Hairs on antenna sparse, .01 long, hardly evident; sensoria 11-24 on III in alate vivipara (p. 373)........*olivacea*

Genotype *Forda formicaria* Heyden

The Grain Root Aphid

Forda formicaria Heyden, 1837:292; Theobald, 1929:169 and 350; Gillette, 1918c:282. *Forda occidentalis* Hart, 1894:95; Mordvilko, 1928:1070; Gillette and Palmer, 1934: 237; Mordvilko, 1935:145 (synonym—*Pemphigus semilunarius* Passerini, 1856).

Apterous Summer Vivipara. Pale to medium olive-green or grayish green, mottled; head and appendages pale brownish. Body length 2.6-2.8; hind tibia .80-.85; antenna .80-1.1; rostrum attaining mid-abdomen. Hairs simple, .05 on vertex and III and side of abdomen.

Alate Summer Vivipara. Head and thorax black; abdomen sordid straw-yellow to olive-green; with dusky dorsal bands and lateral areas; appendages blackish; veins of fore wing heavy and slightly bordered. Body length 2.2-3; antenna .80-1; hind tibia .80-1.20; rostrum attaining abdominal I.

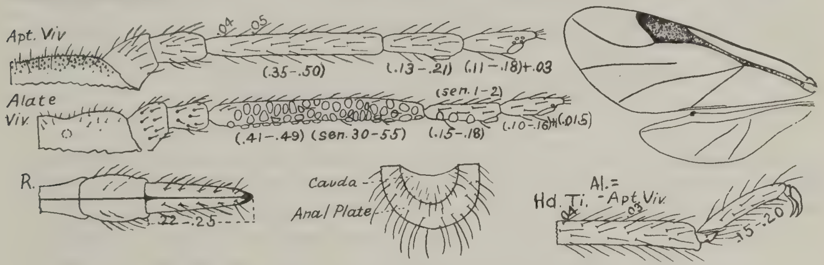

Fig. 450. *Forda formicaria*

Collections. Primary host, *Pistacia terebinthus,* according to Mordvilko (1935:145) (not occurring naturally in North America); secondary hosts, *Melica bulbosa, Poa pratensis, Phleum alpinum, Elymus* sp., on roots and in ants' nests. Colorado: Longmont, Estes Park, Masonville and Fort Collins. Apterous viviparae all the year around; alate viviparae June 2 to July 2; common.

Our species as described by Gillette (op. cit.) has been declared distinct from *F. formicaria* by Theobald (1929:174) on account of supposed differences in length and sensoriation of antennal segments in alate vivipara. Theobald was possibly misled by statement by Gillette that number of sensoria on III were 30. This appears to be the smallest number occurring in the specimens so far examined, the variation being from 30-55. This abolishes the difference maintained by Theobald. An alate and an apterous viviparous specimen determined as *F. formicaria* by Hille Ris Lambers, appears identical with our form.

Furthermore, comparison of our form with cotypes of *F. occidentalis* Hart (op. cit.) revealed no differences except such as were attributable to immaturity of Hart's examples. These facts appear to confirm Gillette's opinion (op. cit.) that the Colorado form is *F. formicaria* Heyden and that *F. occidentalis* is a synonym.

Forda olivacea Rohwer

Forda olivacea Rohwer, 1908:68; Gillette, 1918c:283; Gillette and Palmer, 1934:238; Mordvilko, 1935:164 (=*wilsoni* Mordvilko).

Apterous Vivipara. Sordid greenish yellow, dusky on head and somewhat on pronotum, and on dorsal bands on abdominal VII and VIII and cauda; appendages sordid yellow to slightly dusky. Body 2.5 by 1.5; hind tibia .45; hind tarsal II .15; antenna .54; rostrum attaining 3d coxa. Dorsum of head and body thickly covered with spinules. Hairs inconspicuous or not evident, not longer than .01, sparse.

Alate Vivipara. Head and thorax black; abdomen dark olive-green, with dusky dorsal bands on all segments; appendages black. Body length 1.8-2.5; hind tibia .75-.80; antenna .65-.70, rostrum attaining 2d coxa. Hairs not evident on vertex; on antennal III, hind tibia and on side of abdomen .01.

Collections. Primary host, *Pistacia* sp.* (not occurring naturally in North America); secondary hosts, roots of *Agropyron* sp., *Bromus inermis* and *B. tectorum, Echinochloa crusgalli, Elymus* sp., *Hordeum* sp., Kentucky bluegrass *(Poa pratensis), Setaria* sp., barley, oat and wheat and in ants' nests. Colorado: Generally in northeastern part of state on plains and foothills, also at Fort Lewis. Utah: Mount Timpanogos. Apterous viviparae all months of the year, alate viviparae June 10 to Aug. 21; very common, often quite injurious.

Type. U.S.N.M.

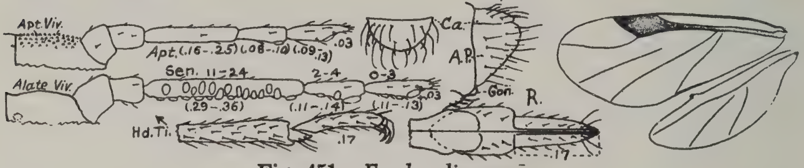

Fig. 451. *Forda olivacea*

This species appears to be very close if not identical with *F. marginata* Koch, judging the latter species from Koch's description of the apterous vivipara, Vayssiere's (Theobald, 1929:189) brief description of alate vivipara and from examination of apterous viviparae sent by Hille Ris Lambers from Holland. However, Mordvilko (1935:164) has a different conception of Koch's species and considers *Forda follicularia* (Passerini) as very close. More information is necessary before the synonymy can be decided.

Genus **Geoica** Hart

Hart, 1894:101; Baker, 1920a:79; Maxson 1923:318.

Characters. Antenna four- or five-segmented in aptera, five- or six-segmented in alata, I and II coequal in length, IV short and thick; secondary sensoria oval, permanent sensoria ciliated. Eye in aptera consisting of ocular tubercle only. Cauda semilunar.** Cornicle lacking. Fore wing with media simple; hind wing with both media and cubitus. Living subterranean on roots and attended by ants.

Genotype (monotypical), *Geoica squamosa* Hart [synonym of *Geoica utricularia* (Passerini)].

Genotype *Geoica utricularia* (Passerini)

Pemphigus utricularius **Passerini, 1856:260.**
Geoica squamosa **Hart, 1894:101; Hottes and Frison, 1931a:356; Gillette and Palmer, 1934:239.**
Geoica utricularia**, Mordvilko, 1935:202 (synonymy).**

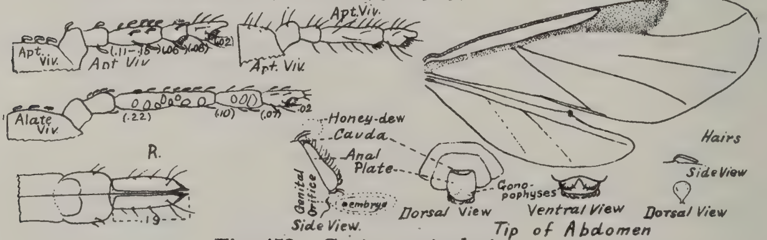

Fig. 452. *Geoica utricularia*

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*According to Mordvilko (op. cit.) who considers his *wilsoni* which infests *Pistacia* as primary host to be the same species as *olivacea*.

**The unusually large rectangular anal plate has evidently been mistaken for the cauda by several writers who have described the cauda as "large and rectangular." In live aphids observed for determining this point a drop of honeydew was extruded dorsad to the rectangular plate, as indicated in figure.

Apterous Vivipara. Pale straw-yellow, brown on head, intersegmental dots and dorsal bands on abdominal VI, VII and VIII; appendages brownish. Body length 1.5-2; hind tibia .35-.40; hind tarsal II .10-.12; antenna .45 four- or five-segmented; rostrum surpassing 2d coxa. Hairs usually fanlike, bent, squamous, rarely simple, .02-.03 long; cauda minute; anal plate large and rectangular.

Alate Vivipara. Same as apterous vivipara except wing 2.45, hamuli 4 in number and antenna five- or six-segmented.

Collections. On roots of *Echinochloa crusgalli* and other grasses, *Artemisia* sp., *Juncus* sp. and ants' nests. Throughout northeastern part of Colorado from Boulder to Cherokee Park and Virginia Dale. Apterous viviparae Feb. 17 and April 3 to Aug. 30; rather rare.

Mordvilko (1935:202) reports the primary or winter host to be *Pistacia* on which it causes leaf galls. *Pistacia* does not occur in North America and the aphid remains on the summer or secondary host throughout the year.

Genus **Trifidaphis** Del Guercio

Trifidaphis Del Guercio, 1909b:332.
Tullgrenia van der Goot, 1912:96.

Characters. Antenna five-segmented in aptera, five- and six-segmented in alata; II decidedly longer than I; secondary sensoria round to oval; permanent sensoria without cilia. Hairs simple; numerous and rather conspicuous. Cornicle lacking. Cauda semilunar; anal plate rectangular and large. Fore wing with media simple; hind wing with both media and cubitus.

Genotype (fixed by Del Guercio, 1909), *Pemphigus radicicola* Essig. Only two, doubtfully distinct, species represented in region.

Trifidaphis phaseoli (Passerini)

Tychea phaseoli Passerini, 1860:39.
Tullgrenia phaseoli, van der Goot, 1915:514.
Trifidaphis phaseoli, Theobald, 1929:208; Gillette and Palmer, 1934:240; Mordvilko, 1935:183.

Apterous Summer Vivipara. Pale pinkish yellow or flesh color with head, pronotum and tip of abdomen brownish; powdery; appendages brownish. Body length 1.5-2.7; globose; hind tibia .40-.50; hind tarsal II .13-.15; antenna .50-.58; rostrum nearly attaining 3d coxa. Hairs simple and numerous; on hind tibia and body .03-.04.

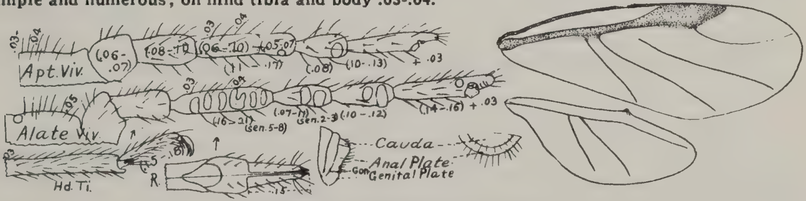


Fig. 453. *Trifidaphis phaseoli*

Alate Vivipara. Head and thorax black; abdomen olive-green to olive-brown, abdominal VI, VII and VIII with dark dorsal dashes; appendages blackish; stigma dark on posterior border. Body length 2.3-2.7; hind tibia .60-.80; antenna .75-.80; rostrum attaining 2d coxa; fore wing 2-2.9 long; hamuli 2-4 in number. Hairs simple and numerous; body .02-.03; cauda very small. Anal plate large and rectangular.

Collections. On roots of cultivated beans, potato, parsnip, *Euphorbia* sp., and *Galium* sp. Throughout region. Apterous viviparae June 6 to Nov. 10, alate viviparae July 22 to Sept. 28; not common.

Genotype *Trifidaphis radicicola* (Essig)

Pemphigus radicicola Essig, 1909a:9.
Trifidaphis radicicola, Essig, 1910a:283; Swain, 1919:141.

Characters. Similar to *T. phaseoli,* indeed the writer has been unable to establish any distinguishing characters. The type specimen of alate vivipara had five-segmented antenna, but Swain (op. cit.) states both five- and six-segmented antennae occur among the cotypes; so unless a mixture of species exists in the cotypes, this removes the distinguishing characters between the genera of *Tullgrenia* and *Trifidaphis*. Essig states in correspondence that a probable mixture of species exists in the cotypes but proof that they are not variations is lacking.

Species Not Included in Key

Not included on account of uncertainty of characters, both specific and generic, due to lack of alate specimens and present unavailability of typic material and specimens used by Cockerell.

Forda interjecti Cockerell

Forda interjecti Cockerell (W. P.), 1903:217.

Apterous Vivipara. Bright yellow; cauda brown. Body oval or ovate with sutures rather distinct; antennal I .045, II .06, III .12, IV .06, V .114+.024. Hairs not evident on body and antenna; cauda hairy.

Recorded in ants' nest. New Mexico: Las Vegas and Las Valles. Apterous viviparae March 22 and 24 and Oct. 11. (Data for above description obtained from original description.) This species resembles *F. olivacea,* especially in color, but differs in measurements of antennal segments.

Geoica lucifuga (Zehntner)

Tetraneura lucifuga Zehntner, 1897:555.
Pemphigus lucifugus, Cockerell, 1904:262.
Geoica lucifuga, Mordvilko, 1935:214.

Recorded by T. D. A. Cockerell from New Mexico without description, host plant, date or locality.

(Not described here on account of unavailability of collected specimens from region.)

Tychea crassa Cockerell*

Tychea crassa Cockerell, (W. P.), 1903:218.

Apterous Vivipara. Brownish. Eye very prominent, on tubercle. Hairs on body Sparse, appendages hairy. Body length 3; antennal I .075, II .117, III .132, IV .069, V .114+.30.

Collections. In ants' nests. New Mexico: Old Pecos (near Rowe). Apterae April 2.

Data for above description obtained from original description.

Tychea pallidula Cockerell*

Tychea pallidula Cockerell, (W. P.), 1903:217.

Similar to *P. lasii,* differing as follows: Light yellow body, small size, eye on tubercles, antennal segments as follows: I .03, II .06, III .056, IV .03, V .09+ .018. These individuals were evidently oviparae as they were described as containing eggs.

Collections. In ants' nest. New Mexico: Beulah. Apterae March 28 "and several times afterwards."

Data for description were taken from original description.

Subfamily **Hormaphinae** Gillette and Palmer

Hormaphidinae Baker, 1920a:81.
Hormaphinae Gillette and Palmer, 1934:241.

Characters. Frontal tubercles lacking. Thoracic lobes not evident. Cornicle mere ring or absent. Scalelike or aleyrodiform generations often developed. Sexuales small and apterous, with rostrum; ovipara laying several eggs. Living in galls or exposed.

*Genus as determined by Mrs. Cockerell. *Tychea* Koch is a synonym of *Pemphigus* Hartig (Baker, 1920a:71). *Tychea* as used by Passerini is a synonym of *Geoica* Hart (Baker) (op. cit.). Determination as to which of these genera these species belong is impossible without more characters not only of apterae (the specimens of which are at present unavailable) but of alatae, which latter were not taken.

Key to Tribes of Hormaphinae

1. Aleyrodiform generations not developed. (Not recorded from region.) .... *Oregmini*
.... Aleyrodiform generations developed 2
2. Cornicle absent. Insects usually gall formers (p. 377) .... *Hormaphini*
.... Cornicle usually present. Insects usually not gall formers (p. 377) .... *Cerataphini*

Tribe **Cerataphini** Gillette and Palmer

Cerataphidini Baker, 1920a:86.
Cerataphini Gillette and Palmer, 1934:241.

Characters. Aptera scalelike. Antenna three- to five-segmented in aptera, five-segmented in alata; secondary sensoria annular. Cornicle distinct, on raised base. Anal plate bilobed; cauda knobbed. Legs small. Wax secretion abundant. Living on surfaces of leaves.

Key to Genera of Cerataphini

1. Antenna of aptera (aleyrodiform) five-segmented. (Not recorded from region.) .... *Aleurodaphis*
.... Antenna of aptera (aleyrodiform) four-segmented. (p. 377) .... *Cerataphis*
.... Antenna of aptera (aleyrodiform) three-segmented. (Not recorded from region.) .... *Thoracaphis*

Genus **Cerataphis** Lichtenstein

Lichtenstein, 1882:16; Baker, 1920a:87.

Characters. Vertex in aptera with two hornlike projections. Antenna four-segmented in aptera, five-segmented in alata; secondary sensoria annular. Cornicle a mere ring on raised base. Rostral V indistinct. Aptera aleyrodiform, with two divisions. Wax glands prominent. Cauda knobbed; anal plate bilobed. Fore wing with media once-branched; hind wing with both media and cubitus. Genotype (monotypical), *Coccus lataniae* Boisduval.

Genotype *Cerataphis lataniae* (Boisduval)

The Latania Aphid

Coccus lataniae Boisduval, 1867:355.
Cerataphis lataniae, Gillette and Palmer, 1934:241.

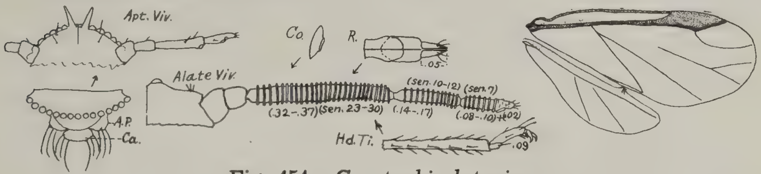


Fig. 454. *Cerataphis lataniae*

Apterous Vivipara. Body scalelike 1-1.2 long; hind tibia .24; hind tarsal II .06-.08; antenna .27. Body with groove separating thorax from abdomen and surrounded with lateral glands which secrete white waxy plates composed of thin strands. Appendages completely hidden. Eye of 3 facets only. Rostrum attaining 2d coxa.

Alate Vivipara. Body length 1.4; hind tibia .40; antenna .60-.85.

Collections. On leaves of palm. Colorado: Fort Collins. Apterous viviparae Jan. 25 to March 30, alate viviparae May 30; rare.

Tribe **Hormaphini** Gillette and Palmer

Hormaphidini Baker, 1920a:83.
Hormaphini Gillette and Palmer, 1934:242.

Characters. Aleyrodiform generations developed. Wax secreted from special glands. Secondary sensoria annular. Cornicle lacking. Cauda knobbed; anal plate bilobed.

Key to Genera of Hormaphini

1. Antenna of alata three-segmented; hind wing with only media. (Not taken in region.) .... *Hormaphis*
.... Antenna of alata five-segmented; hind wing with both media and cubitus (p. 378) .... *Hamamelistes*

Genus **Hamamelistes** Shimer

Shimer, 1867:284; Baker, 1920a:83.

Characters. Antenna rather thick, bearing numerous narrow and annular sensoria. Antenna three-segmented in coccidlike hibernating aptera, five-segmented in summer aptera and alata. Tarsi two-segmented in summer forms and bearing a pair of capitate hairs; but in aptera may be abortive or missing. Living in leaf galls or as coccidlike forms on twigs and leaves.
Genotype (one unquestioned species), *Hamamelistes spinosus* Shimer.

Genotype *Hamamelistes spinosus* Shimer

***Hamamelistes spinosus* Shimer, 1867:284; Pergande, 1901:25; Gillette and Palmer, 1934:242.**

***Apterous Summer Vivipara.* Body length 1.6; hind tibia .35; antenna .30; rostrum attaining 2d coxa.**

A few individuals taken at Manitou in June had tarsi abortive especially on 1st and 2d tibiae. These individuals may belong to the previous generation as they appear older.

***Alate Vivipara.* Body length 1.5-2; fore wing 2.6-3; hind tibia .45; hind tarsal II .09; antenna .65.**

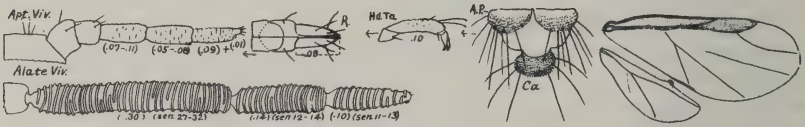


Fig. 455. *Hamamelistes spinosus*

Collections. On leaves of *Betula fontinalis* (alternate host, *Hamamelis* sp., not taken in region); very rare. Colorado: Manitou and Masonville. Apterous summer viviparae June 15 and Aug. 4. (Alate viviparae not taken, described and figured from specimens taken in the eastern United States).

Explanation of Plates

PLATE I

Cinara pseudotsugae. 1, fundatrix; 2, young summer vivipara, 1st instar; 3, same, later instar; 4, adult summer vivipara; 5, alate summer vivipara; 6, ovipara; 7, male.

Cinara pseudotaxifoliae. 8, newly hatched fundatrix; 9, adult fundatrix; 10, alate summer vivipara; 11, apterous summer vivipara, adult; 12, young summer vivipara, 1st instar; 13, same, 3rd instar; 14, ovipara; 15, egg. (After Palmer, 1926. Ann. Ent. Soc. Amer. 19, Plate 24.)

PLATE II

Cinara occidentalis. 1, egg; 2, freshly laid egg; 3, newly hatched fundatrix; 4, adult fundatrix; 5, alate vivipara; 6, ovipara.

Cinara oregonensis. 7, young fundatrix, 1st instar; 8, adult fundatrix; 9, alate vivipara; 10, male; 11, ovipara; 12, freshly laid egg. (After Palmer, 1926. Ann. Ent. Soc. Amer. 19, Plate 26.)

PLATE III

Capitophorus longipes. 1, alate vivipara; 2, apterous summer vivipara.
Macrosiphum glabrum. 3, apterous summer vivipara; 4, alate vivipara.
Macrosiphum frigidicola. 5, apterous summer vivipara; 6, alate vivipara; 7, male; 8, ovipara; 9, egg.

Chaitophorus populella. 10, young apterous summer vivipara, early instar; 11, adult apterous vivipara; 12, alate vivipara. (After Gillette and Palmer, 1928. Ann. Ent. Soc. Amer. 21, Plate I.)

PLATE IV

Macrosiphum sonchellum. 1, apterous summer vivipara; 2, alate vivipara.
Myzus leucocrini. 3, apterous summer vivipara; 4, alate vivipara.
Kakimia polemonii. 5, alate vivipara; 6, male.

Amphorophora geranii. 7, alate vivipara; 8, apterous summer vivipara.
Rhopalosiphum bossekiae. 9, apterous summer vivipara; 10, alate vivipara. (After Gillette and Palmer, 1928. Ann. Ent. Soc. Amer. 22, Plate I.)

PLATE V

Aphis pentstemonicola. 1, fundatrix, X 15; 2, young born of fundatrix, X 15; 3, alate vivipara, X 15; 4, apterous summer vivipara, X 15; 5, young born of summer vivipara, X 15; 6, ovipara, X 15; 7, male, X 15.

Aphis phaceliae. 8, alate vivipara, X 15; 9, fundatrix, X 15; 10, late apterous vivipara, X 15; 11, ovipara, X 15.

Braggia echinata. 12, alate vivipara, X 20; 13, apterous summer vivipara, X 20; 14, ovipara, X 20; 15, male, X 16. (After Gillette and Palmer, 1929. Ann. Ent. Soc. Amer. 22, Plate VII.)

PLATE VI

Aphis pomi. 1, fundatrix; 2, adult apterous summer vivipara; 3, alate vivipara; 4, newborn summer vivipara; 5, alatoid nymph; 6, male; 7, ovipara.

Aphis bakeri. 8, fundatrix; 9, adult summer apterous vivipara; 10, newborn summer vivipara; 11, alatoid nymph; 12, alate vivipara; 13, ovipara.

Rhopalosiphum fitchii. 14, fundatrix; 15, adult apterous vivipara on oat; 16, first instar summer vivipara; 17, alate vivipara, 2nd generation on apple; 18, alatoid nymph; 19, ovipara and egg.

Aphis rosea. 20, adult apterous summer vivipara; 21, first instar summer vivipara; 22, alate vivipara.

Eriosoma lanigerum. 23, adult apterous summer vivipara; 24, first instar summer vivipara; 25, alate vivipara.

(Figures 1-7 and 23-25 after Gillette and Taylor, 1908. Colo. Exp. Sta. Bull. No. 133.)

PLATE VII

Myzus cerasi. 1, fundatrix; 2, nymph, newborn; 3, apterous summer vivipara; 4, alate vivipara.

Myzus persicae. 5, fundatrix; 6, nymph, newborn; 7, apterous summer vivipara; 8, alate vivipara.

Aphis persicae-niger. 9, apterous summer vivipara; 10, nymph, first instar; 11, alate vivipara.

Phorodon humuli. 12, apterous summer vivipara; 13, alate vivipara.
Hyalopterus arundinis. 14, fundatrix; 15, apterous summer vivipara; 16, alate vivipara.

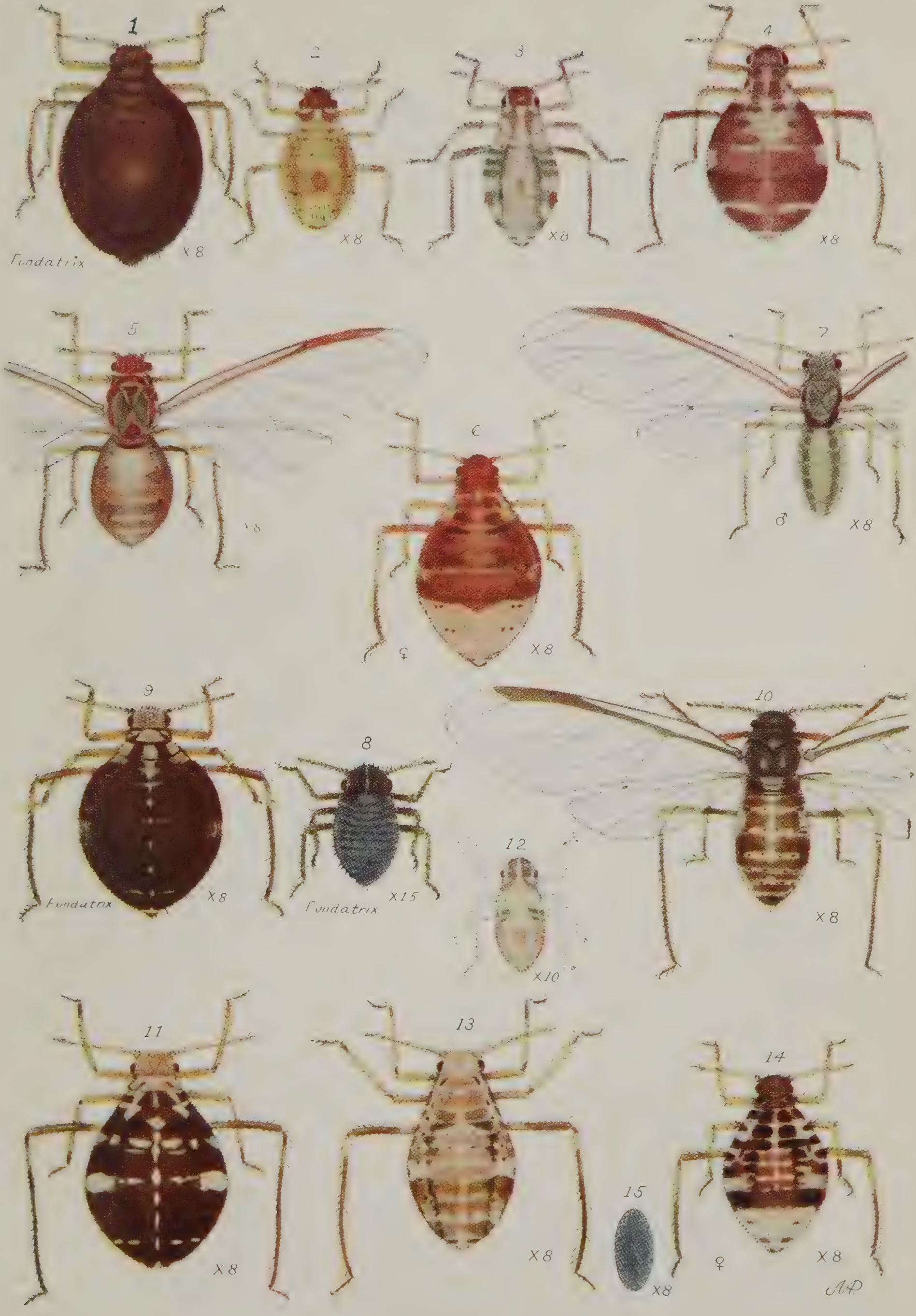
Aphis helichrysi. 17, apterous summer vivipara; 18, alate vivipara.
(Figures 3-11 after Gillette and Taylor, 1908. Colo. Exp. Sta. Bull. No. 133.)

PLATE VIII

Aphis gossypii. 1, apterous summer vivipara, dark color; 2, same, medium color; 3, alatoid nymph; 4, alate vivipara; 5, apterous summer vivipara, pale color; 6, early instar nymph, typical color; 7, same, pale color.

Toxoptera graminum. 8, apterous summer vivipara; 9, alate vivipara.
Macrosiphum solanifolii. 10, fundatrix; 11, alate vivipara; 12, ovipara.
Myzus solani. 13, apterous summer vivipara; 14, alate vivipara.

Pemphigus balsamiferae. 15, apterous summer vivipara; 16, nymph (early instar); 17, alate vivipara; 18, male; 19, ovipara and egg (newly laid). (Original.)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Fundatrix
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X8
3
X8
4
X8
5
X8
6
♀
X8
7
♂
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9
Fundatrix
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8
Fundatrix
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12
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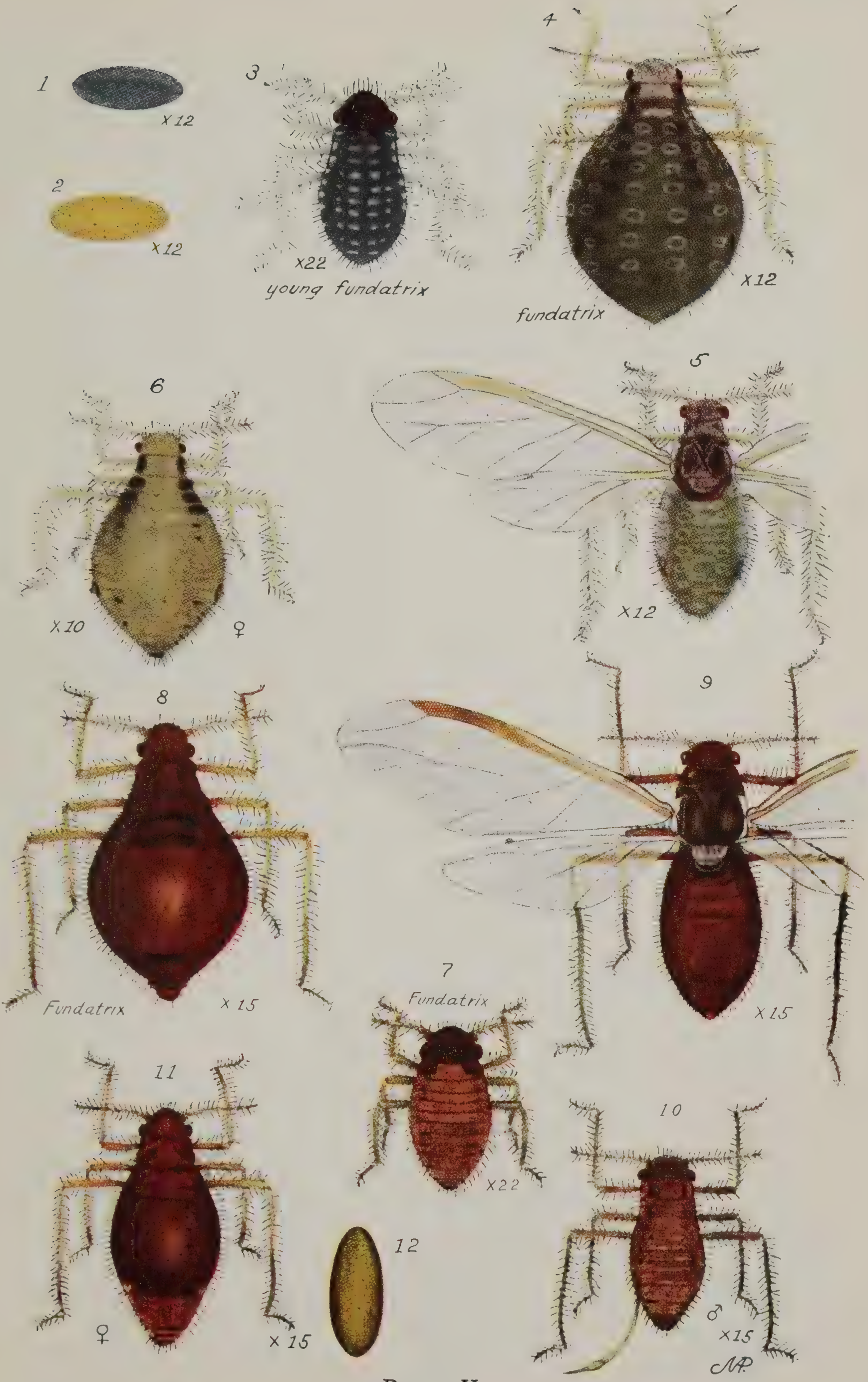
X8

PLATE I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2
x 12
3
x22
young fundatrix
4
x 12
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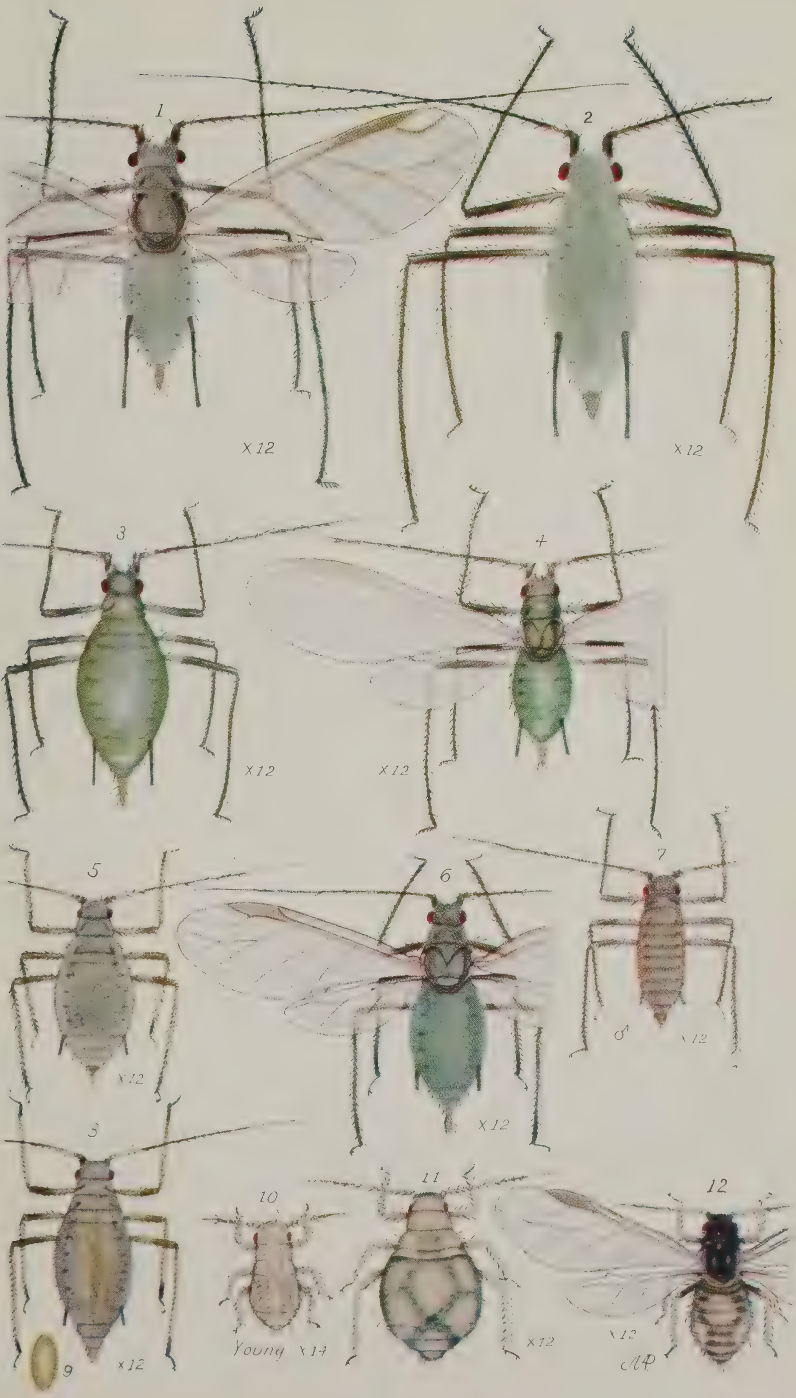
6
x 10
♀
5
x 12
8
Fundatrix
x 15
9
x 15
7
Fundatrix
x 22
11
♀
x 15
12
10
♂
x 15
NP

PLATE II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6
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♂
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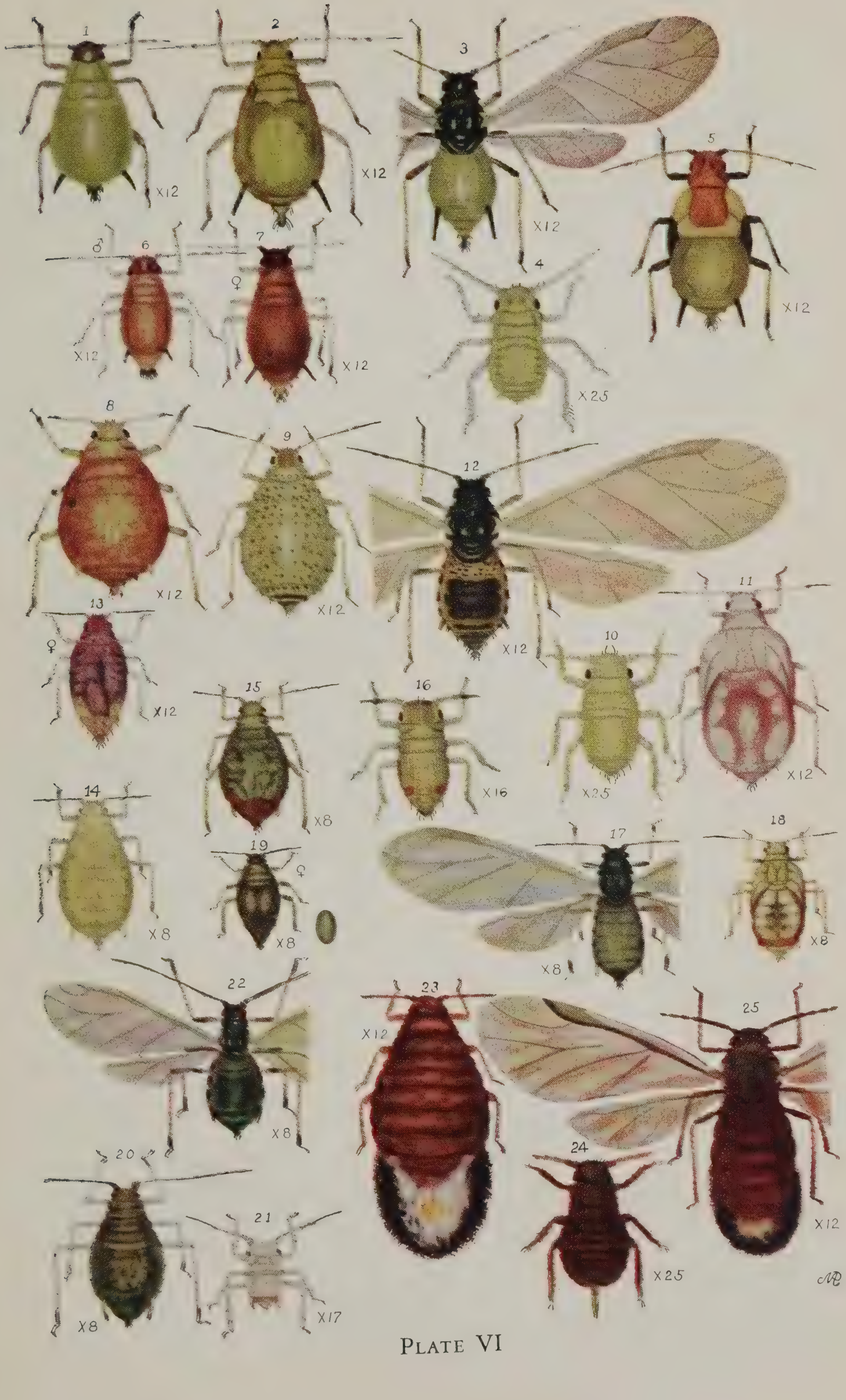
Young x 14
11
x 12
12
x 12
MP

Plate III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9
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11
X12
10
X25
13
♀
X12
15
X8
16
X16
14
X8
19
♀
X8
17
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MR

PLATE VI

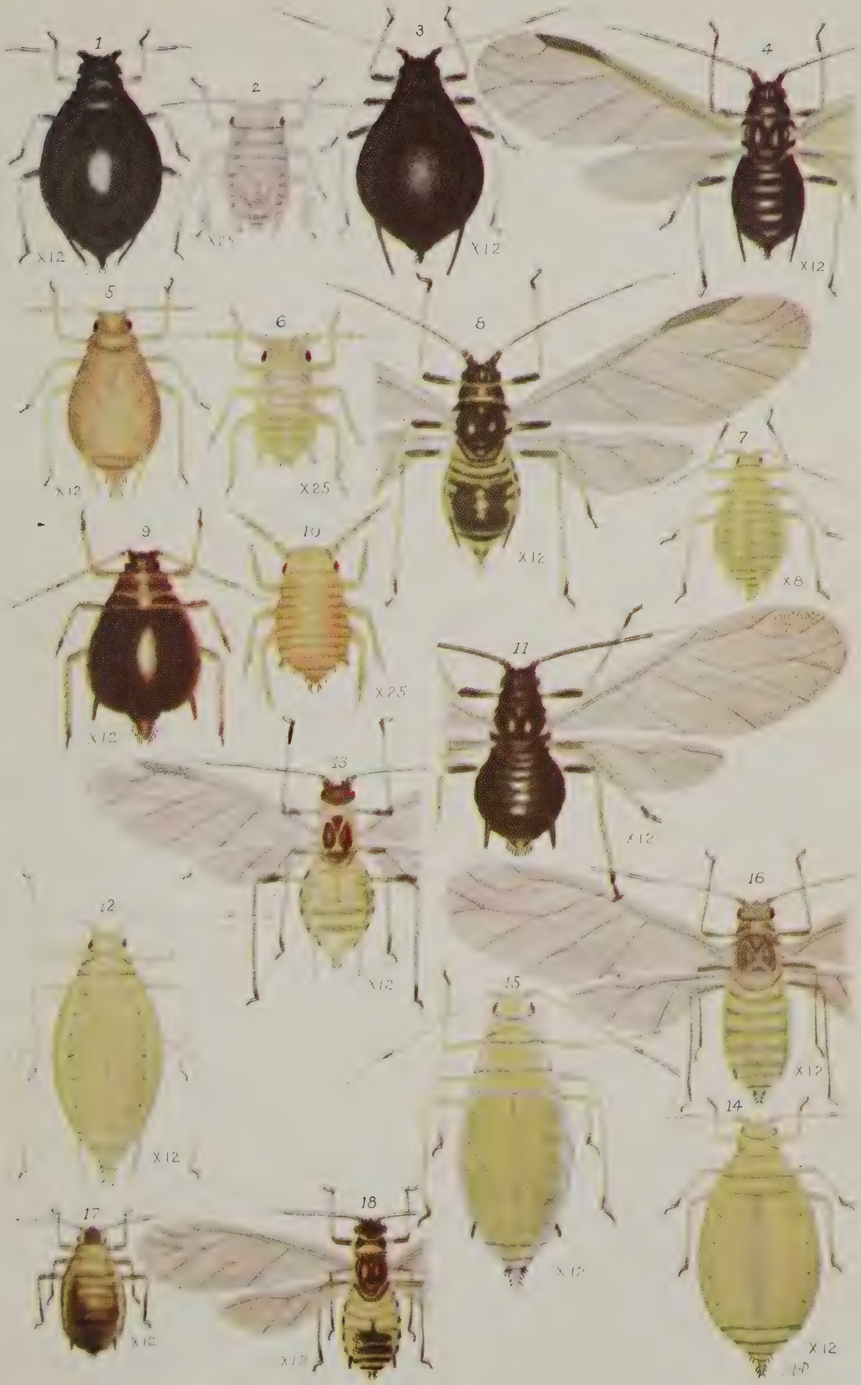
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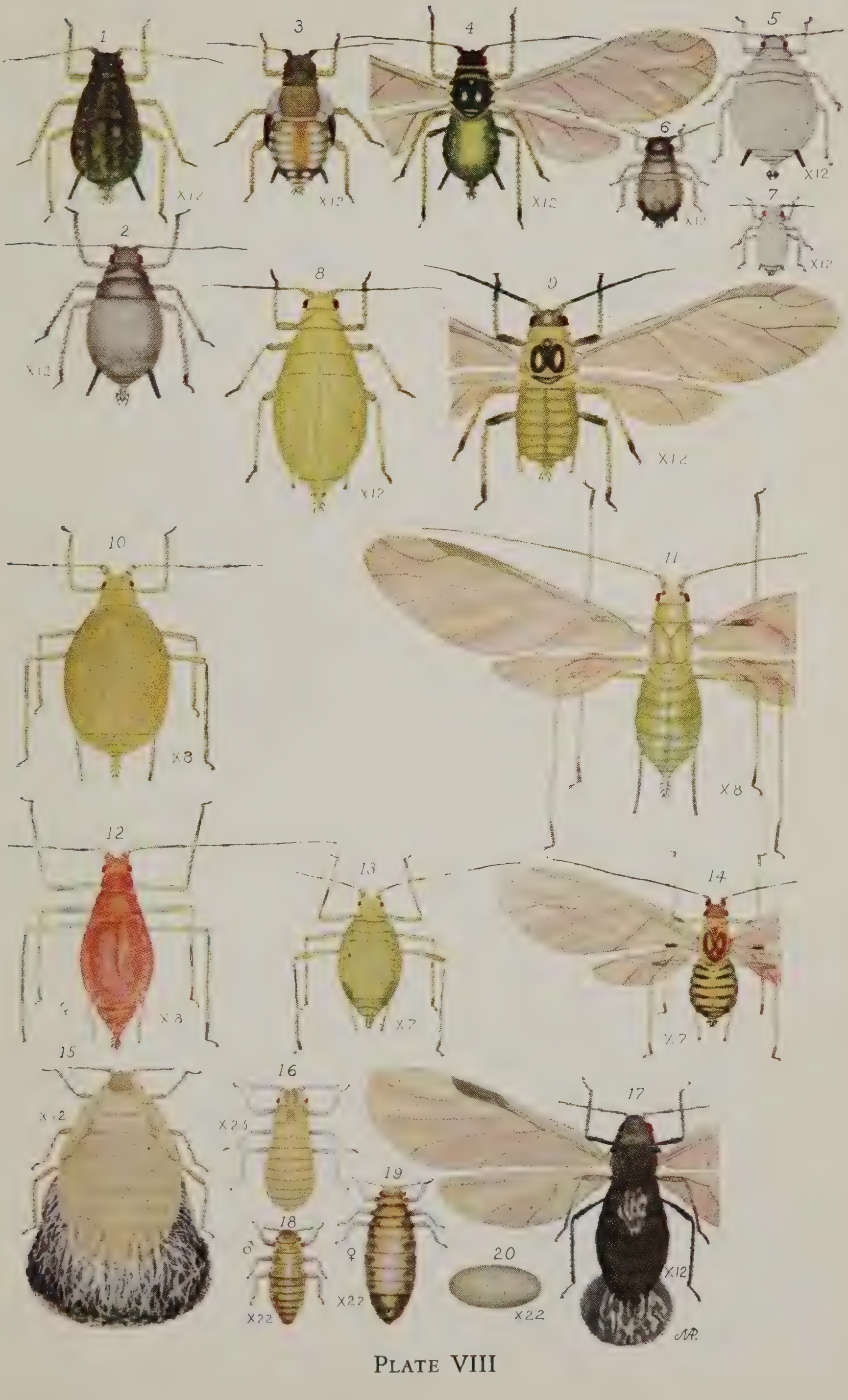
PLATE VII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X8
11
X8
12
X8
13
X7
14
X7
15
X12
16
X25
17
X12
18
♂
X22
19
♀
X22
20
X22
AP

PLATE VIII

Keys to Species of Plant Lice Commonly Infesting Economic Plants in Region, Grouped Under Their Respective Hosts

These keys are designed for the general entomologist, giving field characters such as location on plant, type of injury, color and woolliness of aphid in life but also including characters evident on the mounted specimens. The host plants are arranged alphabetically. Only viviparae are used in the key, unless otherwise stated.

Alder—see Birch

Alfalfa *(Medicago sativa)*

A.—Antenna longer than body; frontal tubercles well developed, exceeding vertex; body pale green.
  B.—Cornicle reticulated at tip.
    C.—Base of VI distinctly longer than tarsal II. (p. 300)..The Alfalfa Aphid *(Macrosiphum creelii)*
    CC.—Base of VI about same length as hind tarsal II. (p. 324)..The Potato Aphid *(Macrosiphum solanifolii)*
  BB.—Cornicle not reticulated at tip, only imbricated. (p. 320)..The Pea Aphid *(Macrosiphum pisi)*

AA.—Antenna shorter than body; frontal tubercles not well developed, not exceeding vertex.
  B.—Body black; sensoria on alata 4 to 7 on III, 0 on IV; cornicle 2 to 3 times length of hind tarsal II. (p. 151)........................The Cowpea Aphid *(Aphis medicaginis)*
  BB.—Body green with black dorsal patch in alata, black speckles in aptera; sensoria on alata 25 to 30 on III, 3 to 7 on IV. Cornicle approximately equal to hind tarsal II. (p. 124)..............................The Short-beaked Clover Aphid *(Aphis bakeri)*

Alfilaria or Filaree *(Erodium cicutarium)*

Body pale green; antenna longer than body; cornicle not swollen, not reticulated, not longer than III; unguis .9 to 1.16 times as long as III; rostral IV+V .14 to .15 long, the same length as hind tarsal II; cauda twice as long as hind tarsal II. (p. 333)...The Storksbill or Filaree Aphid *(Macrosiphum zerozalphum)*

Apple *(Malus sp.)*, Pear *(Pyrus communis)* and Mountainash *(Sorbus sp.)*

A.—On bark primarily, secondarily on leaves and twigs; body brownish red, woolly; cornicle a mere pore; secondary sensoria annular; antenna not longer than half body; fore wing with media once-branched. (p. 351)...The Woolly Apple Aphid *(Eriosoma lanigerum)*

AA.—On leaves and twigs, not on bark. Body usually green; not woolly; cornicle tubular; secondary sensoria circular (Fig. 00); media of fore wing twice-branched. Antenna longer than half body.
  B.—Cornicle hardly longer than hind tarsal II.
    C.—Body longer than 1.5; cornicle imbricated.
      D.—Black dorsal patch on abdomen of alata; rostral IV+V .10 long, not surpassing 2d coxa. (p. 124)....................The Clover Aphid *(Aphis bakeri)*
      DD.—Without dorsal black patch on abdomen of alata; rostral IV+V .15 long, surpassing 2d coxa . (p. 132)..The Long-beaked Clover Aphid *(Aphis crataegifoliae)*
    CC.—Body not longer than 1.5; cornicle smooth (p. 142)..The Leaf-curl Plum Aphid *(Aphis helichrysi)*

BB.—Cornicle at least twice as long as hind tarsal II.

C.—Body rusty brown with dark dorsal patch on abdomen of alate vivipara; amber to salmon to rosy pink in aptera; cauda short, not longer than broad; sensoria 50 to 60 on III, 20 to 30 on IV, 3 to 8 on V in alate vivipara; cornicle curved slightly outward at tip. Curling leaves badly; several generations present in spring, only stragglers in summer. (p. 169)........The Rosy Apple Aphid *(Aphis rosea)*

CC.—Body green, dorsal patch absent on abdomen of alata; cauda longer than wide; sensoria not more than 24 on III, not more than 10 on IV of alate vivipara; cornicle not curved outward. Not curling leaves badly.

D.—Cornicle slightly swollen near tip, pale to dusky; sensoria 12 to 24 on III, 2 to 10 on IV, 1 to 6 on V on antenna of alata; media of fore wing with 2d fork short, one-fourth to one-third the distance from margin of wing to 1st fork. (p. 215)........The Apple-grain Aphid *(Rhopalosiphum fitchii)*

DD.—Cornicle cylindrical or tapering, black; sensoria 6 to 9 on III of alata, absent on IV and V; media of fore wing with 2d fork from third to half of the distance from margin of wing to 1st fork. (p. 164)........The Green Apple Aphid *(Aphis pomi)*

Ash, White *(Fraxinus americana)* and Red *(F. pennsylanica)*

A.—Causing bad curling of leaves. Antenna not longer than third body; body pale yellowish green, with darker green on median line; woolly; wings hyaline. (p. 368)........The Leaf-curl Ash Aphid *(Prociphilus fraxinifoliae)*

AA.—On bark of twigs. Antenna longer than third of body; body brown; woolly; wings slightly smoky. (p. 368)......The Smoky-winged Ash Aphid *(Prociphilus venafuscus)*

Aster *(Aster* sp.*)*

A.—Tarsi lacking. (p. 190)........The Grindelia Aphid *(Atarsos grindeliae)*

AA.—Tarsi present.

B.—Fore wing with media simple; sensoria transverse. Living on roots. (p. 359)........Poplar Sugar-beet Root Aphid *(Pemphigus balsamiferae?)*

BB.—Fore wing with media twice-branched; sensoria circular. Living on twigs and leaves (except *A. armoraciae* and *A. maidi-radicis).*

C.—Frontal tubercles not well developed, not exceeding vertex; cornicle short, less than twice length of hind tarsal II.

D.—Cornicle smooth. Aphids living on leaves and stems.

E.—Cauda elongate, slender on distal half, with one or two capitate hairs at tip; wing veins black. (p. 124)........The Little Black-veined Aster Aphid *(Aphis asterensis)*

EE.—Cauda short, not longer than wide, broad, without capitate hairs at tip; wing veins not black. (p. 142)........The Leaf-curl Plum Aphid *(Aphis helichrysi)*

DD.—Cornicle imbricated. Aphids living primarily on roots or bases of stalks.

E.—Sensoria on III of alata fewer than 10, in aptera fewer than 8. (p. 151)........The Corn Root Aphid *(Aphis maidi-radicis)*

EE.—Sensoria on III of alata 10 or more, in aptera 8 or more. (p. 123)........The Western Aster Root Aphid *(Aphis armoraciae)*

CC.—Frontal tubercles well developed, exceeding vertex; cornicle long, at least 4 times as long as hind tarsi II.

D.—Frontal tubercles converging; cauda short, shorter than twice hind tarsal II; cornicle not reticulated at tip. (p. 336)........The Crescent-marked Lily Aphid *(Myzus circumflexus)*

DD.—Frontal tubercles diverging; cauda 2 or more times as long as hind tarsal II; cornicle with reticulation on distal end.

E.—Unguis not longer than cornicle.

F.—Unguis about same length as cauda, shorter than distance across eyes. (p. 334)........*Macrosiphum zymozionensis*

FF.—Unguis longer than cauda.

G.—Unguis 1 to 1.5 times distance across eyes; one or two capitate hairs near tip of cauda. (p. 304)........The Canada Fleabane Aphid *(Macrosiphum erigeronensis)*

GG.—Unguis twice distance across eyes; no capitate hairs on tip of cauda. (p. 311)........*Macrosiphum katonkae*

EE.—Unguis longer than cornicle.

F.—Reticulated area on cornicle same length as hind tarsal II; body green.

G.—Reticulated area on cornicle one-sixth to one-fourth of length of cornicle; hind tarsal II .15 long, not slender. (p. 296)......*Macrosiphum breviscriptum*

GG.—Reticulated area on cornicle one-fourth to one-third of length of cornicle; hind tarsal II .20 to .22 long, slender. (p. 327)......*Macrosiphum tenuitarsis*

FF.—Reticulated area on cornicle twice as long as hind tarsal II; body dark reddish brown to black. (p. 294)......The Dark Red Aster and Goldenrod Aphid *(Macrosiphum atripes)*

Beet, Sugar *(Beta vulgaris)*

A.—Living on root. Body pale yellow; woolly; antenna and hind tibia short; antenna shorter than half body length; cornicle absent or mere ring. (p. 359)......The Poplar Sugar-beet Root Aphid *(Pemphigus balsamiferae)*

AA.—Living on leaves. Body pale yellow-green or black; not woolly; antenna and hind tibia long; antenna longer than half body length; cornicle present.

B.—Frontal tubercles not exceeding vertex; body black. (p. 135)......The Bean Aphid *(Aphis fabae)*

BB.—Frontal tubercles exceeding vertex; body green with only dorsal patch black in alata. (p. 340)......Green Peach Aphid *(Myzus persicae)*

Birch *(Betula)* and Alder *(Alnus)*

A.—Causing deformation of leaves. Body of aptera bearing a distinct marginal fringe of waxy threads; sensoria ringlike, encircling antenna. (On *Betula*) (p. 378)......*Hamamelistes spinosus*

AA.—Not causing deformation of leaves. Body of aptera not bearing a fringe of waxy threads; sensoria not ring-like, not encircling antenna.

B.—Frontal tubercles distinct; body not with black crossbands.

C.—Sensoria narrow-transverse; body often very woolly. (p. 68)......The American Birch Aphid *(Euceraphis gillettei)*

CC.—Sensoria not narrow-transverse; body not very woolly.

D.—Cornicle mammiform; alata with 2 longtitudinal brown vittae on thorax. (p. 78)......*Oestlundiella flava*

DD.—Cornicle not mammiform; body without dark markings.

E.—Hairs capitate in alata. (p. 67)......*Cepegillettea betulifoliae*

EE.—Hairs simple in alata. (p. 65)......*Calaphis granovskyi*

BB.—Frontal tubercles not distinct; body with black crossbands.

C.—Antenna not longer than body; unguis 2 times length of base of VI; sensoria fewer than 10; hairs on vertex long and curved or wavy. (p. 76)......*Neosymydobius annulatus*

CC.—Antenna longer than body; unguis shorter than base of VI; sensoria more than 10; hairs on vertex short and spinelike. (p. 77)......*Neosymydobius intermedius*

Blackberry and Raspberry *(Rubus* sp.*)*

A.—On false wild raspberry or thimbleberry. *(Rubus* or *Bossekia deliciosus.)* Frontal tubercles not exceeding vertex; cornicle slightly swollen. (p. 213)......False Raspberry Aphid *(Rhopalosiphum bossekiae)*

AA.—Not on false wild raspberry

B.—Body small, hardly longer than 1 to 1.5; frontal tubercles not exceeding vertex.

C.—Antenna six-segmented (p. 170)......*Aphis rubicola*

CC.—Antenna usually five-segmented (p. 171)......*Aphis rubifolii*

BB.—Body large, length 2 to 3; frontal tubercles exceeding vertex.

C.—Cornicle swollen; cauda longer than twice hind tarsal II.

D.—Fore wing with blackish spot near tip; cornicle with distinct reticulation near tip. (p. 242)......The Spotted-winged Raspberry Aphid *(Amphorophora rubicola)*

DD.—Fore wing without blackish spot; cornicle without distinct reticulation.

E.—Cornicle pale or but slightly dusky at tip; veins not bordered.

F.—IV shorter than III.

G.—III longer than cornicle (p. 241)........................The European Raspberry Aphid *(Amphorophora rubi)*

GG.—III coequal with cornicle (p. 245)........................*Amphorophora utahensis*

FF.—IV coequal with III. (p. 232)..............*Amphorophora bonnevilla*

EE.—Cornicle dusky; veins bordered. (p. 244)........................*Amphorophora tigwatensa*

CC.—Cornicle cylindrical; cauda shorter than twice length of hind tarsal II. (p. 342)........................The Foxglove Aphid *(Myzus solani)*

Bluegrass—see Grass

Blue Spruce—see Spruce

Boxelder *(Acer negundo)*

A.—Body large, 3 long; antenna longer than body; cornicle brown, much longer than hind tarsal II; frontal tubercles well developed. (p. 88)....................*Drepanosiphum braggii*

AA.—Body medium in size, hardly 2 long; antenna shorter than body; cornicle pale, shorter than hind tarsal II; frontal tubercles absent. (p. 98)..............*Periphylus negundinis*

Broccoli—see Cabbage

Cabbage, Broccoli and Cauliflower *(Brassica oleracea)*

A.—Body powdery; frontal tubercles not exceeding vertex; cornicle swollen, shorter than hind tarsal II, sensoria about 50 on III of alata. (p. 194)........................The Cabbage Aphid *(Brevicoryne brassicae)*

AA.—Body not powdery; frontal tubercles exceeding vertex; cornicle much longer than hind tarsal II; sensoria 10 to 15 on III of alata. (p. 340)........................The Green Peach Aphid *(Myzus persicae)*

Carnations *(Dianthus caryophyllus)*

Body pale green, alata with dorsal dark patch, sometimes broken, on abdomen; frontal tubercles converging; cornicles elongate, either cylindrical or slightly swollen; cauda once to twice as long as rostral IV+V and third to half of distance across eyes. (p. 340)........................The Green Peach Aphid *(Myzus persicae)*

Cauliflower—see Cabbage

Cedar, Rocky Mountain Red or Juniper *(Juniperus scopulorum* and *utahensis)*

A.—Large hairy forms 2 to 3 long. On bark of twigs and small limbs.

B.—Hairs on hind tibia short and inconspicuous, .05 long, shorter than diameter of tibia. (p. 26)........................*Cinara burrilli*

BB.—Hairs on hind tibia .08 to .10 long, hardly as long as diameter of hind tibia. (p. 44)........................The Powdery Juniper Aphid *(Cinara pulverulens)*

BBB.—Hairs on hind tibia .17 to .25 long, twice as long as diameter of tibia. (p. 45)........................The Rocky Mountain Juniper Aphid *(Cinara sabinae)*

AA.—Aphids not large and hairy, smaller than 2. On needles or twigs.

B.—Body hemispherical, appearing as minute drop on upperside of needle. Hind tibia and antenna shorter than half of the body length; frontal tubercles not developed. (p. 225)............The Hemispherical Juniper Aphid *(Siphonotrophia gravida)*

BB.—Body not as above; normal; antenna longer than body; hind tibia nearly as long as body; frontal tubercles well developed, exceeding vertex. (p. 238)........................The Long-legged Juniper Aphid *(Amphorophora morrisoni)*

Celery *(Apium graveolens)*, Cowparsnip *(Heracleum lanatum)* and Garden Parsnip *(Pastinaca* sp.*)*

A.—Frontal tubercles not exceeding vertex; antenna shorter than body.

B.—Abdomen with supracaudal process in aptera, median tubercle on terminal segment in alata; dorsum of aptera rugose.

C.—Cornicle swollen.

D.—Supracaudal process triangular, as long as cauda; unguis shorter than 1.5 times base of VI. (p. 196)........................*Cavariella aegopodii*

DD.—Supracaudal process knoblike, much shorter than cauda; unguis 3.5 to 4 times as long as base of VI. (p. 197)........................*Cavariella essigi*

CC.—Cornicle cylindrical. (p. 198)........................*Cavariella theobaldi*

BB.—Terminal segment without supracaudal process or tubercle.

C.—Cornicle swollen.

Pale yellow-brown; sensoria numerous and tuberculate on III and IV in alata; cornicle about twice as long as hind tarsal II; cauda tapering, hardly longer than hind tarsal II, bearing 3 hairs on each side. (p. 213) ....The Honeysuckle and Parsnip Aphid *(Rhopalosiphum conii)*

CC.—Cornicle cylindrical.

D.—Cauda broad, short, .05 long on median line.

E.—Cornicle imbricated, without definite encircling depression next to flange.

F.—Numerous tuberculate sensoria on III and IV in alata; body pale brown to white with dark dorsal patch on abdomen of alata. Cauda with 2 hairs on each side. (p. 181)..........The Tulip Bulb Aphid *(Aphis tulipae)*

FF.—Sensoria not tuberculate, 6 to 8 on III in alata, 4 in aptera; dorsal patch absent on abdomen of alata; cauda with about 5 hairs on each side. (p. 133)..........*Aphis crypta*

EE.—Cornicle smooth, with encircling depression next to flange; dorsal dark patch on abdomen of alata; cauda with 2 to 3 hairs on each side. (p. 142)..........The Leaf-curl Plum Aphid *(Aphis helichrysi)*

DD.—Cauda spoon-shaped longer than .05 on median line.

E.—Sensoria 7 to 10 on III of alata; cauda bearing 2 to 4 hairs on each side; body pale yellow, medium green, or blackish green, mixed in same colony. (p. 139)..........The Melon Aphid *(Aphis gossypii)*

Sensoria 15 to 32 on III of alata; cauda bearing 4 lateral and 4 dorsolateral hairs on each side; body yellow-green or yellowish brown. (p. 143)..........The Wild Parsnip Aphid *(Aphis heraclella)*

AA.—Frontal tubercles exceeding vertex (Fig. 409); antenna at least as long as body.

B.—Body pale green, with dark dorsal patch or bands in alata; sensoria absent on antenna of aptera; cornicle usually swollen (in spring migrants cylindrical), not with striae, .45 to .60 long except in fall migrant .30 to .43. (p. 340)..........The Green Peach Aphid *(Myzus persicae)*

BB.—Body pale green, immaculate in both alata and aptera, with darker green blotch about each cornicle base; sensoria 1 to 6 on III of aptera; cornicle always cylindrical, with 2 or 3 cross striae just before large flange, .60 to .75 long in aptera, .50 to .60 in alata. (p. 342)..........The Foxglove Aphid *(Myzus solani)*

Cherry *(Prunus cerasus)*

A.—Body shining black; cornicle black, curved outward at tip; hind tarsal II shorter than base of VI or rostral IV+V. (p. 335)..........The Black Cherry Aphid *(Myzus cerasi)*

AA.—Body pale green with dorsal dark patch, sometimes broken, on abdomen of alata; cornicle dusky, not curved; hind tarsal II as long or longer than base of VI or rostral IV+V. (p. 340)..........The Green Peach Aphid *(Myzus persicae)*

Chokecherry *(Prunus virginiana)*

A.—Frontal tubercles projecting beyond vertex; dorsal patch or dark bands present on abdomen of alata. (p. 340)..........The Green Peach Aphid *(Myzus persicae)*

AA.—Frontal tubercles not developed beyond vertex; dorsal patch not present on abdomen of alata.

B.—Cornicle present, at least 3 times as long as rostral IV+V and twice as long as base of VI. (p. 128)..........The Chokecherry Aphid *(Aphis cerasifoliae)*

BB.—Cornicle absent. (p. 187)..........*Asiphonaphis pruni*

Chrysanthemum (Chrysanthemum sp.)

A.—Frontal tubercles developed beyond vertex.

B.—Body amber-brown to black, shining; cornicle about the same length as cauda, thick, tubular, broadened at the base, reticulated over half of the length. (p. 323)..........The Black Chrysanthemum Aphid *(Macrosiphum sanborni)*

BB.—Body pale green; cornicle longer than cauda, slender not noticeably broader at the base, without reticulation. (p. 340)..........The Green Peach Aphid *(Myzus persicae)*

AA.—Frontal tubercles not developed beyond vertex.

B.—Abdomen of alata with dark dorsal patch or bands; cornicle shorter than unguis, not longer than 1.5 times rostral IV+V, cylindrical and smooth. Cauda short and broad. (p. 142)..........The Leaf-curl Plum Aphid *(Aphis helichrysi)*

BB.—Abdomen of alata without dorsal patch or bands; cornicle longer than unguis, 2 to 3 times length of rostral IV+V, slightly swollen. Cauda elongate. (p. 221)....................The Pale Chrysanthemum Aphid *(Rhopalosiphum rufomaculatum)*

Cineraria *(Cineraria* sp.*)*

A.—Antenna longer than body; frontal tubercles exceeding vertex.

B.—Cornicle with either reticulation or striae at tip; alata without dorsal dark patch on abdomen.

C.—Cornicle reticulated at tip, without darker green spot about base; alata immaculate. (p. 324)............................The Potato Aphid *(Macrosiphum solanifolii)*

CC.—Cornicle with apical striae, with darker green spot about base; alata with intersegmental dashes and lateral spots. (p. 342)..The Foxglove Aphid *(Myzus solani)*

BB.—Cornicle without reticulation or striae; with dorsal dark patch or bands on alata.

C.—Aptera immaculate; cornicle swollen, longer than distance across eyes in aptera, shorter in alate vivipara; sensoria absent on IV. (p. 340)...The Green Peach Aphid *(Myzus persicae)*

CC.—Aptera with dorsal horseshoe-shaped patch; cornicle cylindrical, shorter than distance across eyes; sensoria present on IV in alata. (p. 336) ....The Crescent-marked Lily Aphid *(Myzus circumflexus)*

AA.—Antenna shorter than body; frontal tubercles not exceeding vertex.

B.—Cornicle smooth; cauda short and broad; body pale green with dark dorsal patch present on abdomen of alata. (p. 142)...The Leaf-curl Plum Aphid *(Aphis helichrysi)*

BB.—Cornicle imbricated; cauda elongate, spoon-shaped; body pale yellow, medium green or dark green individuals in same colony; without dark dorsal patch in alata. (p. 139)................................The Cotton or Melon Aphid *(Aphis gossypii)*

Clematis *(Clematis ligusticifolia)* or Western Virginsbower

On leaves, on underside, rather solitary.

Frontal tubercles exceeding vertex; antenna longer than body; body pale greenish yellow; cornicle swollen slightly, about same length as III, with reticulated area as long as hind tarsal II; rostral IV+V longer than hind tarsal II; cauda tapering, .25 long on median line, twice length of hind tarsal II, bearing 2 to 4 hairs on a side. (p. 232)...The Wild Clematis Aphid *(Amphorophora brevitarsis)*

Clover, Red and White *(Trifolium* sp.*)* and Sweetclover *(Melilotus* sp.*)*

A.—Frontal tubercles exceeding vertex; hind tibia longer than half of body.

B.—Frontal tubercles converging; cornicle as long as 1 to 1.5 times distance across eyes; cauda 2 to 3 times as long as rostral IV+V and 1 to 1.5 as long as hind tarsal II. (p. 340)................................The Green Peach Aphid *(Myzus persicae)*

BB.—Frontal tubercles diverging; cornicle 1.5 to 2 times as long as distance across eyes; cauda 3 to 4 times as long as rostral IV+V and 2.5 to 3 times as long as hind tarsal II. (p. 320)..................................The Pea Aphid *(Macrosiphum pisi)*

AA.—Frontal tubercles not exceeding vertex; hind tibia not longer than half body.

B.—Body black, shining; sensoria 4 to 7 on III of alata; cornicle 2 to 3 times as long as hind tarsal II or base of VI. (p. 151)..The Cowpea Aphid *(Aphis medicaginis)*

BB.—Body green, with or without dorsal patch on abdomen in alata; sensoria 20 or more on III of alata; cornicle about the same length as hind tarsal II or of base of VI.

C.—Dorsal patch present on abdomen of alata; rostral IV+V .10 long, attaining 2d coxa; sensoria usually absent on V.

D.—Cornicle imbricated. (p. 124)..................The Clover Aphid *(Aphis bakeri)*

DD.—Cornicle smooth. (p. 142)........Leaf-curl Plum Aphid *(Aphis helichrysi)*

CC.—Dorsal patch absent on abdomen of alata, rostral IV+V .15 long, attaining 3d coxa; sensoria present on V of alata. (p. 132).. ....The Long-beaked Clover Aphid or Hawthorn Aphid *(Aphis crataegifoliae)*

Corn, Indian *(Zea mays)* and Broom Corn *(Sorghum vulgare)*

A.—Frontal tubercles exceeding vertex; dorsal patch, sometimes broken, present on abdomen of alata. (p. 340)..The Green Peach Aphid *(Myzus persicae)*

AA.—Frontal tubercles not exceeding vertex; abdomen of alata without dorsal patch or bands.

B.—Body black; cornicle not shorter than V. Cauda longer than base of VI, spoon-shaped, bushy. (p. 135)..The Bean Aphid *(Aphis fabae)*

BB.—Body light green, sometimes with dusky markings; cornicle not longer than V; cauda not longer than base of VI, not spoon-shaped and bushy.

C.—Cauda tapering, short and bushy, with about 6 pairs of hairs; rostral IV+V, not broad.

D.—Sensoria 10 or more on III of alata, 8 or more in aptera. (p. 123) ....The Western Aster Root Aphid *(Aphis armoraciae)*

DD.—Sensoria fewer than 10 on III of alata, fewer than 8 in aptera. (p. 151)..The Corn Root Aphid *(Aphis maidi-radicis)*

CC.—Cauda spoon-shaped, bearing only 2 pairs of lateral hairs; rostral IV+V broad. (p. 217)........................The Corn Leaf Aphid *(Rhopalosiphum maidis)*

Cottonwood, Poplar and Aspen *(Populus spp.)*

A.—Living exposed on leaves, twigs and bark at bases of twigs. Cornicle present and evident.

B.—Cornicle elongate; cylindrical or clavate.

C.—Cornicle longer than IV; body dark.

D.—Body black with white patches; cornicle black, 1.5 to 2 times as long as IV, not swollen; cauda elongate. (p. 150)..The Spotted Poplar Aphid *(Aphis maculatae)*

DD.—Body bluish to dark brown; cornicle ochre yellow, swollen, 1 to 1.5 times as long as IV; cauda semilunar, inconspicuous. (p. 110)........................The Black Willow and Poplar Aphid *(Pterocomma smithiae)*

CC.—Cornicle not longer than IV; body yellow-olive-green to red-brown.

D.—Cornicle uniformly cylindrical. (p. 109)........................The American Poplar Bark Aphid *(Pterocomma pseudopopulea)*

DD.—Cornicle more or less swollen.

E.—Cornicle 1.5 to 2 times as long as hind tarsal II or about same as IV. Unguis 1.5 times base of VI. (p. 108)........................The Reddish-brown Poplar Aphid *(Pterocomma populifoliae)*

EE.—Cornicle shorter than 1.5 times length of hind tarsal II, shorter than IV. Unguis twice as long as base. (On Aspen). (p. 105)........................*Pterocomma beulahensis*

BB.—Cornicle truncate. Living on leaves and twigs.

C.—Veins of wings bordered; cauda semilunar.

D.—Body of aptera greenish yellow, alata with darker bands on abdomen. (p. 99)........................The Cloudy-winged Cottonwood Leaf Aphid *(Periphyllus populicola)*

DD.—Body dark green to shining black in aptera, abdomen light green with heavy bands in alata. (On Aspen, rarely on cottonwood.) (p. 97)........................The Black Cloudy-winged Poplar Leaf Aphid *(Periphyllus bruneri)*

CC.—Veins of wings not bordered; cauda knobbed.

D.—Body of aptera pale green; alata without distinct dark bands on abdomen; sensoria 2 to 7 on III, 0 on IV in alata. (p. 90)........................The Clear-winged Cottonwood Leaf Aphid *(Chaitophorus populellus)*

DD.—Body of aptera pale green, alata with distinct bands on abodmen; sensoria 9 to 14 on III, 0 to 4 on IV in alata. (On Aspen.) (p. 92)........................The Clear-winged Aspen Leaf Aphid *(Chaitophorus populifoliae)*

AA.—Living in galls or pseudo galls or rosette leaf formations. Cornicle inconspicuous, a mere pore or absent.

B.—Pseudo galls or simple folded or bent leaves. Stem mother with five-segmented antenna.

C.—Living in rosette formed by backward curved leaves. Wings hyaline, media once-branched; hairs inconspicuous; vertex in aptera not with hornlike projection. Stem mother on petiole, progeny on unexposed side of leaves. On aspen *(Populus tremuloides)* (p. 355)........................The Aspen Rosette Aphid *(Asiphum rosettei)*

CC.—Living in simple pseudo gall composed of a single folded leaf.

D.—Leaf folded pocketlike, with edges folded under. (Figure 427.) Wings slightly clouded, media once-branched; hairs prominent on appendages; vertex in aptera not with hornlike projection. Stem mother living with progeny. On aspen *(Populus tremuloides)*. (p. 356)........................The Aspen Leaf-pocket Aphid *(Asiphum sacculi)*

DD.—Living in crescent-shaped pseudo gall formed by margin of leaf folded back on upperside of leaf (Fig. 429). Wings hyaline, media simple; hairs inconspicuous; vertex with hornlike projection in aptera. Stem mother living with progeny. On narrow-leaf cottonwood *(Populus angustifolia)*. (p. 357)......The Crescent-gall Poplar Aphid *(Cornaphis populi)*

DDD.—Leaf folded downward on midrib. (Fig. 425, 447 and 448.) Wings hyaline, media simple (except usually once-branched in *Asiphum pseudobyrsum)*; hairs not conspicuous; vertex in aptera not with hornlike projection. Stem mother not living with progeny.

E.—Stem mother in almond-shaped pocket midway on midrib (Fig. 425), progeny locating along veins of same leaf. Media once-branched or simple; sensoria oval-transverse, absent on VI. On *Populus sargenti*. (p. 355)......The Poplar Leaf-purse Aphid *(Asiphum pseudobyrsum)*

EE.—Stem mother in separate pseudo gall formed by folded leaf edge, on older leaf (Fig. 448). Sensoria narrow-transverse, present on VI in alata. On *Populus occidentalis*. (p. 370)...The Folded-leaf Cottonwood Aphid *(Thecabius populi-conduplifolius)*

EEE.—Stem mother in small almond-shaped pseudo gall on upperside of leaf, not along midrib (Fig. 447), progeny on entire under surface of same leaf. Sensoria narrow-transverse, absent on VI. On *Populus tacamahaca*. (p. 370)...The Folded-leaf Tacamahac Aphid *(Thecabius gravicornis)*

BB.—Living in true galls formed of leaves, petioles or twigs. Stem mother with four-segmented antenna; living with progeny. Wings hyaline, media simple; sensoria narrow-transverse.

C.—Living in complicated bladder-like leaf gall about 80 by 50, composed of crumpled and enlarged leaf or leaves of terminal bud (Fig. 430). Unguis in spring migrant longer than base of VI and bearing sensoria, in fall migrant shorter than base. (p. 358)...The Poplar Vagabond Aphid *(Mordvilkoja vagabunda)*

CC.—Living in simple thick-walled galls. Unguis always shorter than base of VI and not bearing sensoria.

D.—Living in globular gall on twig at base of petiole or occasionally on petiole, mouth of gall transverse, rarely with protruding lips (Fig. 438). Sensoria usually present on all antennal segments but sometimes only on III, 9 to 11. III .22 to .25. (p. 364)...The Poplar Twin-gall Aphid *(Pemphigus populi-ramulorum)*

DD.—Living in globular galls on petiole; mouth of gall transverse (Fig. 439). Sensoria 2 to 5 on III, absent on IV, V and VI in spring migrant; primary sensoria on V and VI enlarged and containing chitinous islands. III .13 to .15. (p. 364)...The Poplar Leaf-stem Gall Aphid *(Pemphigus populi-transversus)*

DDD.—Living in globular gall composed of petiole and leaf base.

E.—Gall not twisted, on upperside of leaf; exit a slit on underside of leaf among midrib (Figs. 434 and 437).

F.—Gall with constriction at lower third (Fig. 434). Sensoria oval-transverse, 3 to 6 on III, 1 to 2 on IV, absent on V and VI. (On narrowleaf and tacamahac poplar.) (p. 361)... *Pemphigus monophagus*

FF.—Gall not constricted (Fig. 437). Sensoria narrow-transverse appearing annular on III, present on all antennal segments, 5 to 10 on III. (On narrowleaf poplar.) (p. 363)...The Poplar Bullet Gall Aphid *(Pemphigus populi-globuli)*

EE.—Gall twisted in appearance (Figs. 433 and 436).

F.—Gall composed chiefly of petiole; exit a slit between petiole and thickened leaf base (Fig. 433). Sensoria occasionally anastomosing, especially on V and VI. (p. 361)...The Poplar Petiole-leaf Gall *(Pemphigus juncti-sensoriatus)*

FF.—Gall composed chiefly of leaf base; exit a pinhole in crease between petiole and leaf base (Fig. 436). Sensoria not anastomosing (Fig. 436).

G.—Sensoria on VI 3 to 6. (p. 363)...The Poplar Leaf-petiole Gall Aphid *(Pemphigus populi-caulis)*

GG.—Sensoria on VI 7 to 11. (p. 362)..............*Pemphigus nortonii*

DDDD.—Gall formed by pouchlike swelling of leaf base (Figs. 431 and 440).

E.—Gall located on upperside of leaf; exit a slit on underside along midrib (Fig. 440). Sensoria present on VI. (p. 365)..The Poplar-vein Gall Aphid *(Pemphigus populi-venae)*

EE.—Gall located on underside of leaf; exit a slit on upperside of leaf along midrib (Fig. 431). Sensoria absent on VI, rarely 1 on V. (p. 359)....The Poplar Sugar-Beet Root Aphid *(Pemphigus balsamiferae)*

Cowparsnip—see Celery

Cucumber and Muskmelon *(Cucumis* sp.*)* and Squash, Gourd and Pumpkin *(Cucurbita* sp.*)*

A.—Frontal tubercles not exceeding vertex; antenna shorter than body.

B.—Body black; sensoria 12 to 18 on III, 0 to 6 on IV, of alata; cauda bushy, with 6 or 7 hairs on each side. (p. 135)..............................The Bean Aphid *(Aphis fabae)*

BB.—Body pale yellow to dark green, usually yellow-green; sensoria in alata 7 to 10 on III, 0 to 2 on IV; cauda not bushy, with only 2 or 3 hairs on a side. (p. 139)..The Cotton or Melon Aphid *(Aphis gossypii)*

AA.—Frontal tubercles exceeding vertex; antenna as long or longer than body.

B.—Body pale green, dark dorsal patch or bands present on abdomen of alata; frontal tubercles converging; cornicle cylindrical or slightly swollen, not reticulated, .30 to .60 long; cauda .20 to .25 long, with 3 hairs on each side. (p. 340)..The Green Peach Aphid *(Myzus persicae)*

BB.—Body pale green or pinkish, without dorsal patch in alata; frontal tubercles diverging; cornicle cylindrical, reticulated on distal end, .85 to 1.15; cauda .40 to .50 long, with 4 to 6 hairs on each side. (p. 324)..The Potato Aphid *(Macrosiphum solanifolii)*

Currants and Gooseberries *(Ribes* sp.*)*

A.—Causing puffed red blisters on leaves of cultivated currant. Hairs capitate, especially conspicuous in aptera; alata with dark dorsal patch on abdomen; sensoria present on III, IV and V in alata. (p. 268)............The Currant Aphid *(Capitophorus ribis)*

AA.—Not causing red blisters on leaves. Hairs not conspicuously capitate.

B.—Curling leaves very tightly. Frontal tubercles hardly exceeding vertex.

C.—On gooseberry. Cornicle shorter than 4 times as long as hind tarsal II; rostral IV+V .12 long, 1.5 times hind tarsal II. (p. 280)..The Gooseberry Witch-broom Aphid *(Kakimia houghtonensis)*

CC.—On wild red or squaw currant *(Ribes cereum)*. Cornicle 4 to 5 times as long as hind tarsal II; rostral IV+V .17 to .19, twice as long as hind tarsal II. (p. 276)...The Wild Currant Aphid *(Kakimia cerei)*

CCC.—On native black or golden currant *(Ribes aureum)*. Cornicle 3 to 4 times as long as hind tarsal II; rostal IV+V .16 to .17, 1.5 times as long as hind tarsal II. (p. 282)..*Kakimia ribe-utahensis*

BB.—Curling leaves moderately or not at all.

C.—Frontal tubercles well developed, exceeding vertex. Cornicle more or less swollen towards tip; hairs slightly capitate but inconspicuous.

D.—Tibiae dark. (p. 239)..*Amphorophora nigricornis*

DD.—Tibiae pale.

E.—Alata with dark dorsal patch on abdomen and with sensoria present on IV and V; hairs minute. (p. 242)....................................*Amphorophora sonchi*

EE.—Alata without dark dorsal patch on abdomen and with sensoria absent on IV and V; hairs quite noticeable. (p. 240)...The Ornamental Currant Aphid *(Amphorophora ribiella)*

CC.—Frontal tubercles not well developed, not exceeding vertex; cornicle cylindrical or tapering towards tip; hairs slightly capitate or simple.

D.—Antenna not shorter than body; hairs slightly capitate; unguis at least 4 times as long as base.

E.—Sensoria usually present on IV and V in alata; sexuales present in the fall. (p. 278)..................................The Dogberry Aphid *(Kakimia cynosbati)*

EE.—Sensoria never present on IV and V in alata; sexuales present in July. (p. 282)..*Kakimia ribe-utahensis*

DD.—Antenna shorter than body; hairs simple; unguis shorter than 4 times base.

E.—Cornicle shorter than twice hind tarsal II. (p. 167)..............*Aphis ribiensis*

EE.—Cornicle 2 or 3 times length of hind tarsal II.

F.—III shorter than unguis. (p. 168)..................................*Aphis ribi-gillettei*

FF.—III not shorter than unguis.

G.—Alata with sensoria absent on V; hairs short, on appendages, not as long as diameter of segment bearing them. (p. 156).......................................The New Mexico Gooseberry Aphid *(Aphis neomexicana)*

GG.—Alata with sensoria present on V; hairs on appendages as long as diameter of segment bearing them. (p. 183)...The Variable Currant Aphid *(Aphis varians)*

Dahlia *(Dahlia* sp.*)*

A.—Body black; cornicle about twice as long as hind tarsal II, imbricated, without abrupt encircling depression next to flange; cauda bushy, with 6 or 7 hairs on each side; longer than wide and spoon-shaped. (p. 135)................The Bean Aphid *(Aphis fabae)*

AA.—Body pale green, alata with black dorsal patch on abdomen; cornicle 1 to 1.5 times as long as hind tarsal II, smooth, with abrupt encircling depression next to flange; cauda not bushy, with only 2 or 3 hairs on a side, broad; hardly longer than wide, slightly tapering. (p. 142)........................The Leaf-curl Plum Aphid *(Aphis helichrysi)*

Dandelion *(Taraxacum officinale)*

A.—Living above ground.

B.—Body dark red-brown, appearing black; appendages black; frontal tubercles developed beyond vertex; antenna about as long as body; cornicle as long as III, reticulated distally; sensoria in alata numerous on III, none on IV or V. (p. 326)..The Dark Dandelion Aphid *(Macrosiphum taraxaci)*

BB.—Body pale to medium green, often with dusky dashes; appendages dusky yellow; frontal tubercles not developed beyond vertex; antenna shorter than body; cornicle shorter than III, not reticulated; sensoria 10 to 16 on III, usually present on IV and V. (p. 123)......The Western Aster Root Aphid *(Aphis armoraciae)*

AA.—Living on roots under ground.

B.—Hind tarsal II nearly as long as hind tibia, twice length of III; media of fore wing faint, once-branched. (p. 000)....The Long-footed Dandelion Aphid *(Trama rara)*

BB.—Hind tarsal II much shorter than hind tibia, shorter than twice length of III; media of fore wing either simple or twice-branched, not faint.

C.—Media of fore wing simple; cornicle absent; sensoria narrow-transverse; cauda semi-lunar. (p. 367)...The White Aster-root Aphid *(Prociphilus erigeronensis)*

CC.—Media of fore wing twice-branched; cornicle cylindrical, at least as long as hind tarsal II; sensoria subcircular; cauda at least as long as wide.

D.—Hairs on appendages reclinate, not numerous, shorter than diameter of the segment bearing them; sensoria 10 to 16 on III of alata. (p. 123)..The Western Aster-root Aphid *(Aphis armoraciae)*

DD.—Hairs on appendages nearly erect, numerous, at least as long as diameter of segment bearing them; sensoria 20 to 24 on III of alata. (p. 146)...*Aphis knowltoni*

Dogwood *(Cornus stolonifera)*

A.—Alata black except anterior segments of abdomen which are white; media of fore wing once-branched; cornicle hardly evident, on low cone. (p. 12)...The White-banded Dogwood Aphid *(Anoecia querci)*

AA.—Alata not colored as above; media of fore wing twice-branched; cornicle plainly evident, elongate.

B.—Body yellow-green, mottled with darker green, with darker green band just anterior to cornicles; hairs inconspicuous, drooping. Absent from May 15 to August. (p. 141)................................The Dogwood or Sunflower Aphid *(Aphis helianthi)*

BB.—Body dark olive-green to blackish; hairs noticeable, erect, especially on tibiae of aptera. Present throughout the summer, alatae appearing middle of June. (p. 155)..The Dark Green Dogwood Aphid *(Aphis neogillettei)*

Elderberry *(Sambucus* sp.*)*

A.—Antenna shorter than body; frontal tubercles not developed to exceed vertex.

B.—Cauda spoon-shaped; cornicle shorter than III, not longer than unguis; sensoria 12 to 19 on III in alata. (p. 135)..................................The Bean Aphid *(Aphis fabae)*

BB.—Cauda short wartlike, tapering; cornicle not shorter than III and not shorter than unguis; sensoria 19 to 30 on III in alata. (p. 174) .... The Elder Aphid *(Aphis sambucifoliae)*

AA.—Antenna longer than body; frontal tubercles well developed, exceeding vertex.

B.—Body 3 to 4 long; cornicle somewhat swollen near distal end, reticulated at tip; cauda with 5 hairs on each side; rostral IV+V same length as hind tarsal II. (p. 243) .... The Large Elderberry Aphid *(Amphorophora stanleyi)*

BB.—Body 1.5 to 2 long; cornicle not swollen and not reticulated; cauda with only 2 or 3 hairs on each side; rostral IV+V shorter than hind tarsal II. (p. 314) .... *Macrosiphum macrosiphum*

Elm, American *(Ulmus americana)*

A.—Living on bark. Body woolly, dull yellow and brown; sluggish; fore wing with media once-branded; antenna short, one-fourth to one-third of body length; sensoria of antenna annular; 13-23 on III, 2-4 on VI; rostral IV+V .18 in alata. (p. 353) .... The Woolly Aphid of the Elm Bark *(Eriosoma rileyi)*

AA.—Living on leaves.

B.—Not deforming leaves or causing galls. Sensoria circular to oblong; 6-10 on III; legs half length of body; body naked; media of fore wing twice-forked; antenna long, nearly equal to body. (p. 75) .... The Elm Leaf Aphid *(Myzocallis ulmifolii)*

BB.—Deforming leaves or forming galls. Sensoria on antenna annular; legs short, not exceeding third of body; body woolly; media of fore wing once-branched or simple; antenna shorter than half body.

C.—Forming cockscomb galls on upperside of leaves. Body green to brown or black; fore wing with media simple or once-branched; sensoria broken, 9 to 15 on III, 1 on VI; rostral IV+V .07 long. (p. 347) .... *Colopha ulmicola*

CC.—Causing leaf pseudo galls.

D.—One side of leaf rolled under. Aphids woolly; dark green to black; fore wing with media once-branched; antenna of alata equal to half body length; sensoria 23 to 27 on III, 0 on VI; rostral IV+V .16 to .19 in alata. (p. 349) .... The Woolly Elm Aphid *(Eriosoma americanum)*

DD.—Rosettelike clustering of leaves on twigs. Aphids woolly; pinkish to reddish brown; fore wing with media once-branched; antenna one-fourth to one-third length of body; sensoria 37 to 46 on III, 0 on VI; rostral IV+V .15 to .18 in alata. (p. 351) .... The Woolly Apple Aphid *(Eriosoma lanigerum)*

Elm, Camperdown *(Ulmus campestris)*

Forming globular or egg-shaped galls attached by pedicel to upper surface of leaf. Aphids slightly powdery; ochre to pinkish cinnamon to dark green; fore wing with media once-branched; antenna short, about one-fifth of body length; sensoria annular 10 to 19 on III, 1 on VI; rostral IV+V .15; tarsal I and II not distinctly separated. (p. 348) .... *Colopha ulmisacculi*

Elm, Red *(Ulmus fulva)*

Forming pouchlike spindle-shaped galls on upperside of leaves; fore wing with media simple or once-forked; antenna short, third to half of body length; sensoria annular, 17 to 20 on III, 6 to 10 on VI; rostral IV+V .08. (p. 354) .... *Gobaishia ulmifusa*

Engelmann Spruce—see Spruce

Fir, Alpine *(Abies lasiocarpa)* and White *(A. concolor)*. On twigs.

A.—Sensoria oval-transverse; cornicle a mere ring; hairs inconspicuous; stigma reaching tip of wing; body pale yellow, appendages pale. (p. 346) .... The Balsam Twig Aphid *(Mindarus abietinus)*

AA.—Sensoria circular; cornicle mammiform, hairy; hairs on body and appendages more or less conspicuous; stigma not reaching tip of wing.

B.—Hairs on antenna and hind tibia usually blunt, shorter than diameter of tibia, especially in alata; body 5 long; hind tibia 3.5 to 4.6; rostral IV .25; body brownish black, with little pulverulence; legs dark. (p. 28) .... The Bow-legged Fir Aphid *(Cinara curvipes)*

BB.—Hairs on antenna and hind tibia long and pointed, longer than diameter of tibia.

C.—Body 4 to 5 long; hind tibia 3.5; rostral IV .25; hairs on hind tibia about 1 to 1.5 times as long as diameter of tibia; body reddish to dark brown, mottled with white pulverulence; legs almost entirely black. (p. 34) .... The Spotted Alpine Fir Aphid *(Cinara lasiocarpae)*

CC.—Body 2 to 3; hind tibia 1.1 to 1.3; rostral IV .14; hairs on hind tibia 3 times as long as diameter of tibia; body yellow-olive-green to green-brown; flocculent; legs pale. (p. 36)..........The Flocculent Fir Aphid *(Cinara occidentalis)*

Fir, Douglas *(Pseudotsuga taxifolia)*. On twigs.

A.—Cornicle mammiform, hairy; body longer than 3; rostral IV .20. (p. 38).. *Cinara osborni*

AA.—Cornicle hardly more than raised rim; body not longer than 3; rostral IV not longer than .16.

B.—Hairs on hind tibia fine, numerous, very drooping; rostral IV .16; body dark brown with powdery patches. (p. 42)..........*Cinara pseudotaxifoliae*

BB.—Hairs on hind tibia rather spinelike, semi-erect, hardly numerous; rostral IV not longer than .12.

C.—Distal half of hind tibia blackish; III at least 3 times as long as rostral IV; body pale brownish, white medially. (p. 43)..........*Cinara pseudotsugae*

CC.—Distal tip only of hind tibia blackish; III 2 to 3 times as long as rostral IV; body pale brownish or greenish to whitish. (p. 48)..........*Cinara splendens*

Geranium, Tame *(Pelargonium sp.)*

Body grape-green; antenna longer than body; cornicle not swollen, not longer than III, not reticulated; rostral IV+V .15 long same as hind tarsal II; cauda shorter than twice hind tarsal II. (p. 319)....The Tame Geranium Aphid *(Macrosiphum pelargonii)*

Geranium, Wild *(Geranium sp.)*

A.—Cornicle not longer than III, slightly swollen, not reticulated; rostral IV+V .25 long, twice as long as hind tarsal II; cauda 2 to 3 times as long as hind tarsi. Dull yellow-green with sooty to grass-green mottling. (p. 235)..The Wild Geranium Aphid *(Amphorophora geranii)*

AA.—Cornicle equal to or longer than III, reticulated next to tip, not swollen; rostral IV+V shorter than twice hind tarsal II.

B.—Body greenish; cornicle bearing hairs. (p. 289)..........*Macrosiphum aetheocornum*

BB.—Body pale yellowish green to pinkish; cornicle not bearing hairs. (p. 324)..The Potato Aphid *(Macrosiphum solanifolii)*

Gladiolus *(Gladiolus sp.)*

A.—Antenna longer than body; frontal tubercles exceeding vertex.

B.—Dorsum of abdomen immaculate in both alata and aptera; cornicle not shorter than III, reticulated before tip; cauda .40 to .50 long. (p. 324)..The Potato Aphid *(Macrosiphum solanifolii)*

BB.—Dorsum of alata not immaculate; cornicle not longer than III, not reticulated; cauda shorter than .40.

C.—Dark dorsal patch or bands on abdomen of alata; cornicle without cross-striae at tip.

D.—Horseshoe-shaped dark patch on dorsum of aptera; cornicle never swollen, shorter than IV. (p. 336)..The Crescent-marked Lily Aphid *(Myzus circumflexus)*

DD.—Dorsum immaculate in aptera; cornicle usually slightly swollen, longer than IV. (p. 340)..........The Green Peach Aphid *(Myzus persicae)*

CC.—Broken intersegmental dashes and lateral areas on abdomen of alate vivipara, apterous vivipara immaculate; cornicle with 2 or 3 cross-striae at tip. (p. 342)..........The Foxglove Aphid *(Myzus solani)*

AA.—Antenna shorter than body; frontal tubercles not exceeding vertex.

B.—Numerous tuberculate sensoria on III of alata; cauda not longer than wide at base, bearing only 2 hairs on a side. (p. 181)..The Tulip Bulb Aphid *(Aphis tulipae)*

BB.—Sensoria not more than 18 on III of alata, not tuberculate; cauda longer than wide at base.

C.—Sensoria 12 to 18 on III of alata; body black; cauda bushy; rostral IV+V .13 to .15 long. (p. 135)..........The Bean Aphid *(Aphis fabae)*

CC.—Sensoria 7 to 10 on III of alata; body yellow, medium green or dark green; cauda not bushy; rostral IV+V .10 to .11 long. (p. 139)..The Cotton or Melon Aphid *(Aphis gossypii)*

Goldenglow *(Rudbeckia sp.)*. On leaves and stems.

A.—Body brick-red; sensoria 34 to 44 on III of alata, 19 to 26 in aptera. (p. 322)..The Goldenglow Aphid *(Macrosiphum rudbeckiae)*

AA.—Body light green; sensoria fewer than 34 on III in alata, less than 19 in aptera.

B.—Sensoria 8 to 10 on III in alate vivipara, 2 to 8 in aptera. (p. 322)..Cockerell's Green Goldenglow Aphid *(Macrosiphum rudbeckiarum)*

BB.—Sensoria 16 to 32 on III in alate vivipara, 4 to 8 in aptera. (p. 298)..Hottes' Green Goldenglow Aphid *(Macrosiphum cockerelli)*

Gooseberry—see Currants

Gourd—see Cucumber

Grain Crops (Oats, barley, millet, rye, wheat)

A.—Living on roots. Cauda semilunar; unguis shorter than base of VI; media of fore wing not twice-branched.

B.—Cornicle on small hairy cone; media of fore wing once-branched.

C.—Body black. (p. 11)..*Anoecia graminis*

CC.—Body yellow to greenish. (p. 13)..*Anoecia setariae*

BB.—Cornicle absent; media of fore wing simple.

C.—Hairs on antenna numerous, at least as long as half the diameter of the antenna; rostral IV+V .25 long; body olive-green, mottled. (p. 373)..The Grain Root Aphid *(Forda formicaria)*

CC.—Hairs on antenna sparse, very short. Rostral IV+V .17 long; body sordid greenish yellow. (p. 373)..*Forda olivaceae*

AA.—Living generally above ground. Cauda elongate; unguis longer than base of VI; media of fore wing twice-branched.

B.—Body long and narrow; cornicle hardly more than ring. (p. 191)..*Brachycolus tritici*

BB.—Body not especially long and narrow; cornicle well developed, tubular.

C.—Frontal tubercles not exceeding vertex.

D.—Cornicle cylindrical.

E.—Media of fore wing once-branched.

F.—Cornicle shorter than twice length of hind tarsal II. Body black. (p. 227)..*Toxoptera muhlenbergiae*

FF.—Cornicle as long as twice length of hind tarsal II. Body green. (p. 226)..The Green Bug *(Toxoptera graminum)*

EE.—Media of fore wing twice-branched.

F.—Body brown; unguis longer than III; sensoria on III in alata 15 to 21. (p. 176)..........The Rusty Plum Aphid *(Aphis setariae)*

FF.—Body black, shining; unguis not longer than III; sensoria on III in alata 4 to 7. (p. 151)..The Cow Pea Aphid *(Aphis medicaginis)*

DD.—Cornicle swollen more or less.

E.—Cornicle distinctly swollen, three times as long as hind tarsal II. (p. 220)..The Sumach Aphid *(Rhopalosiphum rhois)*

EE.—Cornicle slightly swollen to cylindrical; shorter than 3 times as long as hind tarsal II.

F.—Unguis shorter than III; cornicle shorter than 1.5 times hind tarsal II. (p. 217)........The Corn Leaf Aphid *(Rhopalosiphum maidis)*

FF.—Unguis longer than III; cornicle longer than 1.5 times hind tarsal II.

G.—Antenna and hind tibia in aptera bearing long, erect hairs.

H.—Body bright green with red on abdominal V, especially about cornicle bases. (p. 223)..The Mediterranean Grain Aphid *(Rhopalosiphum splendens)*

HH.—Body brown or gray. (p. 224)..*Rhopalosiphum subterraneum*

GG.—Antenna and hind tibia of aptera with inconspicuous drooping hairs. (p. 215)..The Apple Grain Aphid *(Rhopalosiphum fitchii)*

CC.—Frontal tubercles well developed, exceeding vertex.

D.—Frontal tubercles converging; cauda on median line hardly longer than hind tarsal II. (p. 340)............The Green Peach Aphid *(Myzus persicae)*

DD.—Frontal tubercules diverging; cauda on median line distinctly longer than hind tarsal II.

E.—Cornicle black, reticulated next to tip; sensoria 7 to 12 on III of alata; unguis 4 to 5 times length of hind tarsal II. (p. 310)... The English Grain Aphid *(Macrosiphum granarium)*

EE.—Cornicle pale, without reticulation; sensoria on III of alata 18 to 28; unguis three times as long as hind tarsal II. (p. 302)... The Rose Grass Aphid *(Macrosiphum dirhodum)*

Grass, Blue *(Poa sp.)*

A.—On roots. Antenna shorter than half body; frontal tubercles lacking; media of fore wing simple; body sordid yellow to olive-green.

B.—Hairs on antenna sparse, .01 long, hardly evident; sensoria 11 to 24 on III of alata. (p. 373)... *Forda olivacea*

BB.—Hairs on antenna not sparse, .04 to .05 long, longer than half diameter of III, especially in aptera; sensoria 30 to 55 on III of alate vivipara. (p. 373)... The Grain-root Aphid *(Forda formicaria)*

AA.—Above ground. Antenna longer than half body; frontal tubercles present; media of fore wing twice-branched; body grass-green or dark brown.

B.—Cornicle swollen, twice as long as base of VI, without reticulation; sensoria 46 on III, 19 to 26 on IV in alate vivipara, absent in aptera; cauda short and broad, no longer than hind tarsal II, bearing 2 hairs on each side; body brown to black, legs dusky. (p. 219)..............Gillette's Blue Grass Aphid *(Rhopalosiphum poae)*

BB.—Cornicle cylindrical, 3 to 4 times as long as base of VI, reticulated as far as length of hind tarsal II; sensoria 7 to 12 on III, 0 on IV in alata, 1 or 2 on III in aptera; cauda elongate, 1.5 to 2 times as long as hind tarsal II, bearing 3 or 4 hairs on each side; body grass-green; legs pale. (p. 310)... The English Grain Aphid *(Macrosiphum granarium)*

Hawthorne or Haws (Crataegus sp.)

A.—Body covered with woolly threads; sensoria transverse.

B.—Living on bark of limbs and stems. Body dark slaty; sensoria annular. (p. 350)... *Eriosoma crataegi*

BB.—Living in curled leaves. Body olive-green; sensoria transverse-oval. (p. 366)... *Prociphilus corrugatans*

AA.—Body naked; sensoria circular.

B.—Cornicle distinctly swollen (club-shaped); body marked with four green spots on dorsum. (p. 233)... *Amphorophora crataegi*

BB.—Cornicle not distinctly swollen; body not marked with four green spots on dorsum.

C.—Cornicle twice as long as hind tarsal II.

D.—Cornicle black throughout; sensoria 6 to 9 on III, 0 on IV of alata. Present on this host all summer. (p. 164)... *Aphis pomi*

DD.—Cornicle pale with black tips; sensoria 12 to 24 on III, 2 to 10 on IV of alata. Not present all summer. (p. 215)... The Apple Grain Aphid *(Rhopalosiphum fitchii)*

CC.—Cornicle not longer than 1.5 times hind tarsal II.

D.—Cornicle marked by transverse imbrications.

E.—Alata with dark dorsal patch on abdomen; rostral IV+V .10 long, attaining 2d coxa. (p. 124)............The Clover Aphid *(Aphis bakeri)*

EE.—Alata not with dark dorsal patch on abdomen; rostral IV+V .15 long, surpassing 2d coxa. (p. 132)... The Long-beaked Clover or Hawthorn Aphid *(Aphis crataegifoliae)*

DD.—Cornicle smooth. (p. 142)... The Leaf-curl Plum Aphid *(Aphis helichrysi)*

Hollyhock *(Althaea rosea).* On leaves and stems.

A.—Frontal tubercles diverging; body red; cornicle at least 5 times as long as hind tarsal II, 1.3 to 2 times distance across eyes; cauda 3 times as long as hind tarsal II. (p. 303)... The Red Hollyhock Aphid *(Macrosiphum eoessigi)*

AA.—Frontal tubercles converging; body pale green, alata with dark patch or bands on dorsum of abdomen; cornicle 2 to 4 times as long as hind tarsal II, .75 to 1.3 times as long as distance across eyes; cauda 1 to 2 times as long as hind tarsal II. (p. 340)... The Green Peach Aphid *(Myzus persicae)*

Honeysuckle *(Lonicera* sp.*)*. On leaves.

A.—Cornicle absent; frontal tubercles lacking; antenna not longer than half body; sensoria narrow-transverse; media of fore wing simple; cauda rudimentary; body yellow, woolly. (p. 369)..................The Woolly Honeysuckle Aphid *(Prociphilus xylostei)*

AA.—Cornicle present; frontal tubercles developed; antenna longer than half body; sensoria circular; media of fore wing twice-branched.

B.—Cornicle cylindrical, sometimes broader at the base, marked with transverse wrinkles, as long as IV, 2 to 3 times length of hind tarsal II; cauda short, nearly semilunar, bearing short hairs; body orange to clay color; powdery. (p. 114)..................*Amphicercidus flocculosus*

BB.—Cornicle swollen.

C.—Body dark olive-brown; cauda short, not longer than base of VI, tapering, constricted near tip. (p. 217)..................*Rhopalosiphum grabhami*

CC.—Body pale; cauda elongate, longer than base of VI.

D.—Body pale yellow to yellow-brown. Cornicle not longer than III, not reticulated; sensoria present on IV in alata; cauda 1 to 1.5 times as long as hind tarsal II, bearing 3 hairs on a side. (p. 213)..................The Honeysuckle and Parsnip Aphid *(Rhopalosiphum conii)*

DD.—Body pale whitish green; cornicle longer than III, reticulated at tip as far as length of hind tarsal II; sensoria absent on IV; cauda 3 or more times as long as hind tarsal II, bearing 6 to 8 hairs on each side. (p. 234)..................*Amphorophora crystleae*

Hop *(Humulus lupulus)*. On leaves.

A.—Cornicle 3 times as long as hind tarsal II, reticulated area as long as hind tarsal II; frontal tubercle without fingerlike process; sensoria 10 to 18 on III of alata. (p. 324)..................The Potato Aphid *(Macrosiphum solanifolii)*

AA.—Cornicle 2 to 2.5 times as long as hind tarsal II, without reticulation; frontal tubercles with fingerlike projection; sensoria 23 to 27 on III of alata. (p. 344)..................The Hop Aphid *(Phorodon humuli)*

Iris *(Iris* sp.*)*. On bulb.

Antenna shorter than body; sensoria numerous and tuberculate on III, present on IV in alata; cornicle shorter than 1.5 times length of hind tarsal II; cauda short, broad, bearing 2 hairs on each side. (p. 181)..................The Tulip Aphid *(Aphis tulipae)*

Juniper—see Cedar, Rocky Mountain Red

Larkspur *(Delphinium* sp.*)*

A.—Body reddish yellow; antenna not longer than body; sensoria not tuberculate, 1 to 4, on III of alata, absent in aptera; cornicle 1.5 times as long as hind tarsal II. (p. 168)..................The Russet-colored Larkspur Aphid *(Aphis rociadae)*

AA.—Body green to dark brownish green, metallic; antenna longer than body; sensoria 49 to 64 on III of alata, 11 to 38 in aptera, tuberculate; cornicle same length as hind tarsal II. (p. 285)..................The Green-bronze Larkspur Aphid *(Kakimia wahinkae)*

Lily *(Lilium* sp.*)*. On leaves.

A.—Alata with dusky intersegmental lines and lateral areas, aptera immaculate, with deeper green blotch at each cornicle base; cornicle with 2 or 3 apical striae. (p. 342)..................The Foxglove Aphid *(Myzus solani)*

AA.—Alata with dark dorsal patch or bands; cornicle without apical striae.

B.—Aptera immaculate; cornicle usually swollen. (p. 340)..................The Green Peach Aphid *(Myzus persicae)*

BB.—Aptera with dusky horseshoe-shaped marking on dorsum of abdomen; cornicle never swollen. (p. 336)..................The Crescent-marked Lily Aphid *(Myzus circumflexus)*

Limber Pine—see Pine

Locust *(Robinia* sp.*)*. On leaves.

A.—Body black; antenna shorter than body; cornicle tubular, as long as IV, 2 to 3 times as long as hind tarsal II; sensoria circular; cauda elongate, nearly parallel-sided; anal plate entire. (p. 151)..................The Cowpea Aphid *(Aphis medicaginis)*

AA.—Body yellow to yellow-green; antenna as long as body; cornicle truncate, very much shorter than IV, only half as long as hind tarsal II; sensoria oval-transverse; cauda knobbed; anal plate divided. (p. 74)..................The Locust Aphid *(Myzocallis robinae)*

Lodgepole Pine—see Pine

Millet—see Grain Crops

Mountainash—see Apple

Muskmelon—see Cucumber

Nasturtium *(Tropaeolum majus)*. On leaves.

A.—Body black; antenna shorter than body; cornicle cylindrical, 1 to 1.5 times as long as hind tarsal II; sensoria 12 to 18 on III, several usually present on IV in alata. (p. 135)..........The Bean Aphid *(Aphis fabae)*

AA.—Body pale green, alata with dark dorsal patch or bands on dorsum of abdomen; antenna at least as long as body; cornicle swollen, 2 to 4 times as long as hind tarsal II; sensoria 10 to 15 on III, absent on IV in alata. (p. 340)..........The Green Peach Aphid *(Myzus persicae)*

Norway Spruce—see Spruce

Oats—see Grain Crops

Parsnip—see Celery

Peach *(Prunus persica)*

A.—On bark and roots. Frontal tubercles not extending beyond vertex; cauda shorter than hind tarsal II; body shining black to brownish; cornicle twice as long as hind tarsal II. (p. 162)..........The Black Peach Aphid *(Aphis persicae-niger)*

AA.—On leaves and twigs. Frontal tubercles exceeding vertex; cauda not shorter than hind tarsal II; body pale green, black dorsal patch in alata; cornicle longer than twice hind tarsal II. (p. 340)..........The Green Peach Aphid *(Myzus persicae)*

Pear—see Apple

Peas *(Pisum sativum)*

A.—Cornicle as thick or thicker than hind tibia, slightly longer than III, reticulated next to tip as far as .15 to .20, or for same length as hind tarsal II; base of VI same length as hind tarsal II. (p. 324)..........The Potato Aphid *(Macrosiphum solanifolii)*

AA.—Cornicle more slender than hind tibia, slightly shorter than III, not reticulated; base of VI twice as long as hind tarsal II. (p. 320)......The Pea Aphid *(Macrosiphum pisi)*

Pine *(Pinus* sp.*)*. On needles, twigs, cones or bark of limbs.

I. Limber *(Pinus flexilis)*

A.—On needles, at bases. Very agile. Body apple-green without dusky spots; antenna five-segmented; cornicle a mere ring; rostrum obtuse, with V vestigial. (p. 15)..........*Essigella hoerneri*

AA.—On twigs. Not agile. Body brown; antenna six-segmented; cornicle mammiform;; rostrum lancelike, with V distinct.

B.—Dorsum marked with powdery pattern; hairs on dorsum not minute, .05 to .07; cornicle base broader than length of hind tarsal II; rostral IV .12 to .18; antennal III .40 to .50.

C.—Hairs on hind tibia .04 in aptera, hardly as long as half diameter of tibia; .06 to .07 in alata, fully as long as diameter of tibia. (p. 22)..........The Spotted Short-haired Limber Pine Aphid *(Cinara apini)*

CC.—Hairs on hind tibia in aptera .06 to .11, .6 to 1.5 times as long as diameter of tibia; in alata .09 to .11, once to 1.5 times diameter of tibia. (p. 51)..........The Spotted Long-haired Limber Pine Aphid *(Cinara villosa)*

BB.—Dorsum not powdery; hairs on dorsum minute; diameter of cornicle base less than half length of hind tarsal II; rostral IV .20 to .22; antennal III .80 to .90. (p. 30)..........The Black Limber Pine Aphid *(Cinara flexilis)*

II. Lodgepole *(Pinus contorta* var. *murrayana)*

A.—On needles. Cornicle small mammiform or mere ring; rostrum obtuse, with V vestigial.

B.—Body woolly, conspicuous; body surface dark; antenna six-segmented; cornicle mammiform with small base, with diameter same as length of base of VI; hairs absent on dorsum of hind tarsal I. (p. 18)..The Woolly Pine Needle Aphid *(Schizolachnus pini-radiatae)*

BB.—Body not woolly, difficult to see; body surface pale green, speckled; agile; antenna five-segmented; cornicle a mere ring; hairs present on dorsal side of hind tarsal I.

C.—Tibial hairs 2 to 3 times as long as diameter of hind tibia. (p. 14)........................The Monterey Pine Aphid *(Essigella californica)*

CC.—Hairs on hind tibia about the same length as diameter of tibia. (p. 16)........................ *Essigella pini*

AA.—On cones. Body brick-red, shining; cornicle mammiform but small, diameter same as length of base of VI; rostrum lancelike, with V not vestigial. (p. 37)........................ The Pine-cone Aphid *(Cinara oregonensis)*

AAA.—On bark of twigs or small limbs. Body brown, mottled with dusky and slightly powdery spots; cornicle mammiform, diameter at base 2 to 3 times length of base of VI; rostrum lancelike, segment V not vestigial.

B.—Hind tibial hairs in aptera spinelike, drooping, .05 long, shorter than diameter of tibia. (p. 25)..............The Short-haired Lodgepole Pine Aphid *(Cinara brevispinosa)*

BB.—Hind tibial hairs in aptera semi-spinelike, at 45 degrees, .08 long, as long as diameter of tibia. (p. 34)........................The Medium-haired Lodgepole Pine Aphid *(Cinara medispinosa)*

BBB.—Hind tibial hairs in aptera rather heavy, at 45 degrees to erect, .10 to .15 long, from once to nearly twice as long as diameter of tibia. (p. 35)........................The Long-haired Lodgepole Pine Aphid *(Cinara murrayanae)*

III. Pinyon, Mexican *(Pinus edulis)*

A.—On needles, at bases. Very agile; body apple-green, without dusky spots; antenna five-segmented; cornicle a mere ring; rostrum obtuse, with V vestigial. (p. 15)........................The Immaculate Green Pine Needle Aphid *(Essigella hoerneri)*

AA.—On twigs. Not agile. Body brown, antenna six-segmented; cornicle mammiform, hairy; rostrum lancelike, with V distinct.

B.—Hairs on dorsum not minute.

C.—Body light cinnamon-brown or pinkish amber with intersegmental lines and lateral areas; length of tibial hairs between once and twice that of diameter of tibia; rostral IV .15 to .18. (p. 49)........................The Terminal Twig Pinyon Pine Aphid *(Cinara terminalis)*

CC.—Body dull black with powdery median line and intersegmental patches; length of tibial hairs not longer than diameter of tibia; rostral IV .20 to .22 long. (p. 28)......The Black and White Spotted Pinyon Pine Aphid *(Cinara edulis)*

BB.—Hairs on dorsum minute; body shining black; not powdery; rostral IV .19. On small limbs. (p. 23)................................The Black Pinyon Pine Aphid *(Cinara atra)*

IV. Rocky Mountain Yellow *(Pinus ponderosa var. scopulorum)*

A.—On needles. Rostrum obtuse, segment V vestigial.

B.—Conspicuous; body dark; with pulverulence; antenna six-segmented.

C.—Conspicuously woolly; dorsal side of tarsal I without hairs; cornicle a shallow cone, bearing a few hairs. (p. 18)........................The Woolly Pine Needle Aphid *(Schizolachnus pini-radiatae)*

CC.—Somewhat powdery; dorsal side of hind tarsal I bearing a pair of hairs; cornicle merely a raised ring. (p. 17)........................The Powdery Pine Needle Aphid *(Eulachnus rileyi)*

BB.—Not conspicuous, difficult to detect, very agile at concealment; cornicle mere ring; body pale green, sometimes with dusky speckles and blotches; antenna five-segmented.

C.—Dorsum immaculate; tibial hairs .01, not longer than diameter of tibia. (p. 15)....................The Immaculate Green Pine Needle Aphid *(Essigella hoerneri)*

CC.—Dorsum with speckles or blotches; tibial hairs not shorter than diameter of tibia.

D.—Tibial hairs .03 to .04, as long as diameter of tibia; dorsum with rows of dusky spots. (p. 16)........................The Speckled Pine Needle Aphid *(Essigella pini)*

DD.—Tibial hairs longer than diameter of tibia.

E.—Tibial hairs not longer than 2 times diameter of tibia; dorsum with speckles coalesced into bands and blotches. (p. 14)..The Green and Brown Pine Needle Aphid *(Essigella fusca)*

EE.—Tibial hairs in aptera 2 to 4 times diameter of tibia; dorsum marked with speckles. (p. 14)..The Monterey Pine Aphid *(Essigella californica)*

AA.—On cones. Rostrum acute, lancelike; cornicle on small shallow cone, diameter third to half length of hind tarsal II; body brick-red, without powder; tibial hairs erect, .09 to .11, once to twice length of diameter of tibia. (p. 27)..The Pine-cone Aphid *(Cinara oregonensis)*

AAA.—On bark of twigs and small limbs. Rostrum lancelike; cornicle mammiform on hairy cone; body brown to black.

B.—On bark of tender tips head down between bases of clustered needles, solitary; ticklike in action; body yellow-brown to dusky brown; cornicle bearing scattered spinelike hairs and numerous short fine hairs; hairs on hind tibia .07 to .10, as long as diameter of tibia in aptera; .09 to .12, 1.5 to 2 times diameter in alata. (p. 47)..The Ponderosa Pine-tip Aphid *(Cinara solitaria)*

BB.——On bark of twigs, not confined to tips, not solitary, not ticklike; body dark brown to black; cornicle bearing only one kind of hairs.

C.—Body blackish, without powdery markings; hairs minute on dorsum of body; on hind tibia about as long as half the diameter of tibia in aptera; rostral IV .24 to .28, longer than hind tarsal II. (p. 31)..The Glabrous Ponderosa Pine Aphid *(Cinara glabra)*

CC.—Body brown and black with powdery markings; hairs not minute on body.

D.—Hairs slightly capitate; body blackish, marked with patterns of powdery spots; length 4.5 to 5, very large; rostral IV .23 to .25; tibial hairs .06 to .08, less than two-thirds diameter of tibia. (p. 23)..The Giant Pine Aphid *(Cinara arizonica)*

DD.—Hairs simple; body length less than 4.

E.—Body dark brown with black areas and powdery markings; rostral IV .20 to .23.

F.—Tibial hairs fine, very drooping, numerous, short, .03 to .05, shorter than diameter of tibia in aptera; .05 to .07 about equal to diameter of tibia in alata. (p. 45)..
The Short-haired Mottled Ponderosa Pine Aphid *(Cinara schwarzii)*

FF.—Tibial hairs moderately fine, nearly erect, rather numerous, .07 to .08 long, shorter than diameter of tibia in aptera; .08 to .10, longer than diameter of tibia in alata. (p. 41)..*Cinara pseudoschwarzii*

EE.—Body golden brown, metallic, with black spots and broken pattern of pulverulence; rostral IV .18-.21; tibial hairs somewhat spinelike, rather sparse, at angle of 45 degrees, .05 in aptera, .07 to .09 in alata. (p. 40)..................The Golden Pine Aphid *(Cinara ponderosae)*

Pinyon Pine, Mexican—see Pine

Plum *(Prunus* sp.*)*. On leaves and twigs.

A.—Frontal tubercles exceeding vertex; antenna at least as long as body.

B.—Frontal tubercles with fingerlike projection; sensoria 23 to 27 on III of alata. (p. 344)..The Hop Aphid *(Phorodon humuli)*

BB.—Frontal tubercles not with fingerlike projection; sensoria 10 to 15 on III of alata. (p. 340)..The Green Peach Aphid *(Myzus persicae)*

AA.—Frontal tubercles not exceeding vertex; antenna shorter than body.

B.—Cornicle cylindrical, with flange; body brown or green with dorsal dark patch in alate vivipara; not powdery.

C.—Cauda short, hardly longer than broad, shorter than base of VI; body pale green with dark dorsal patch in alata. Rostral IV+V slender. Hind wing with both cross-veins.

D.—Cornicle smooth with circular depression next to flange, shorter than twice length of hind tarsal II; sensoria present on IV in alata; rostral IV+V .10 to .12 long, coequal with base of antennal VI. (p. 142)..The Leaf-curl Plum Aphid *(Aphis helichrysi)*

DD.—Cornicle not as above, twice as long as hind tarsal II. Sensoria absent on IV in alate vivipara. Rostral IV+V .18 to .20, twice as long as base of antennal VI. (p. 127)....................The Thistle Aphid *(Aphis cardui)*

CC.—Cauda elongate, longer than base of VI; body brown; rostral IV+V broad; hind wing with cubital vein vestigial or lacking. (p. 176)..The Rusty Plum Aphid *(Aphis setariae)*

BB.—Cornicle slightly swollen, without flange; body green to pale yellow or rusty, immaculate; powdery. (p. 204)..The Mealy Plum Aphid *(Hyalopterus arundinis)*

Potato *(Solanum tuberosum)*. On leaves and stems.

A.—Dorsum of body immaculate in both alata and aptera; cauda long, twice as long as base of VI, bearing 4 to 6 hairs on a side; cornicle reticulated at tip as far as length of hind tarsal II. (p. 324)......................................The Potato Aphid *(Macrosiphum solanifolii)*

AA.—Dorsum of alata not immaculate; cauda shorter than twice length of base of VI, bearing not more than 3 hairs on each side. Cornicle without reticulation.

B.—Alata with black dorsal bands or patch; cornicle without apical striae; unguis distinctly shorter than 1.

C.—Aptera with dorsal blackish horseshoe-shaped marking on abdomen; cornicle never swollen; cauda on median line same length as rostral IV+V, bearing 2 hairs on each side. (p. 336)..The Crescent-marked Lily Aphid *(Myzus circumflexus)*

CC.—Aptera immaculate; cornicle often swollen; cauda on median line longer than rostral IV+V, bearing 3 hairs on each side. (p. 340)..The Green Peach Aphid *(Myzus persicae)*

BB.—Alata with intersegmental dashes and lateral areas dusky, aptera immaculate, with deeper green blotches at each cornicle base; cornicle with 2 to 3 apical striae; unguis about 1 long. (p. 342)........................The Foxglove Aphid *(Myzus solani)*

Pumpkin—see Cucumber

Radish—see Turnip

Raspberry—see Blackberry

Rhubarb *(Rheum officinale)*. On leaves, in large colonies.

Body black; frontal tubercles not exceeding vertex; antenna not longer than body; cornicle cylindrical, .21 to .29, not longer than III; rostral IV+V obtuse; .13 to .15 long; sensoria 12 to 18 on III, 0 to 6 on IV of alata; cauda spoon-shaped, bushy. (p. 135)..The Bean Aphid *(Aphis fabae)*

Rocky Mountain Yellow Pine—see Pine

Rose *(Rosa* sp.*)*. On leaves and stems and bark.

A.—On bark. Dark hairy aphids; cornicle not tubular but mammiform, hairy; antenna shorter than body; frontal tubercles not developed; hind tarsal I trapezoidal in side view. (p. 54)..The Hairy Rose Aphid *(Lachnus rosae)*

AA.—On leaves and twigs. Pale green aphids (except *Mac. nigromaculosum)*, not noticeably hairy; cornicle tubular, not hairy; antenna longer than body; frontal tubercles exceeding vertex; hind tarsal I triangular in side view.

B.—Hairs conspicuously capitate on vertex and dorsum of body and antennal I, II and base of III, especially in aptera. (p. 256)..The Rose-strawberry Aphid *(Capitophorus fragaefolii)*

BB.—Hairs not conspicuously capitate.

C.—Cornicle swollen. (p. 239)..The Rose and Bearberry Aphid *(Amphorophora nervata)*

CC.—Cornicle cylindrical.

D.—Frontal tubercles diverging; (Fig. 386). Sensoria absent on IV.

E.—Body red-brown to mahogany-red, alata with black band on abdominal V and VI; fore wing dusky at tip; cornicle black, same length as IV, reticulated before tip for same length as length of hind tarsal II. (p. 317)..The Black and Red Rose Aphid *(Macrosiphum nigromaculosum)*

EE.—Body pale green; wings hyaline.

F.—Cornicle black; sensoria on III of alata 40 or more, in aptera 12 to 23. (p. 321)........................The Rose Aphid *(Macrosiphum rosae)*

FF.—Cornicle pale to dusky, not black; sensoria not more than 30 on III of alata, fewer than 12 in aptera.

G.—Cornicle same length as IV, without reticulation; sensoria 18 to 28 on III in alata, 1 to 2 in aptera; unguis not longer than III; rostral IV+V .10, not longer than two-thirds of base of VI or of hind tarsal II. (p. 302)..The Rose-grass Aphid *(Macrosiphum dirhodum)*

GG.—Cornicle longer than IV, reticulated at tip as far as length of hind tarsal II; sensoria 10 to 18 on III of alata, 2 to 6 in aptera; unguis longer than III; rostral IV+V .15, longer than two-thirds of base of VI or of hind tarsal II. (p. 324)......................The Potato Aphid *(Macrosiphum solanifolii)*

DD.—Frontal tubercles converging; sensoria present on IV in alata. (p. 342)..*Myzus porosus*

Russianolive or Oleaster *(Eleagnus angustifolia)*. On leaves and twigs.

A.—Cornicle cylindrical; sensoria 50-54 on III, 33 to 40 on IV, 8 to 14 on V; capitate hairs sparse on body; cornicle in alata same length as III, longer in aptera. (p. 251)..The Oleaster-thistle Aphid *(Capitophorus braggii)*

AA.—Cornicle clavate; sensoria on III of alata fewer than 50, on IV fewer than 20.

B.—Capitate hairs evident and numerous on all body segments in aptera; cauda tapering to blunt tip, bearing 2 hairs on each side; sensoria absent on V in alata; rostral IV+V with needlelike tip .04 long. (p. 270)................*Capitophorus shepherdiae*

BB.—Capitate hairs evident on only anterior and posterior segments of aptera; cauda tapering to acute tip, bearing 4 hairs on each side; sensoria present on V in alata; rostral IV+V without noticeable needlelike tip. (p. 259).. *Capitophorus hippophaes*

Rye—see Grain Crops

Snowberry—see Wolfberry

Spiraea *(Spiraea* sp.*)*. On leaves and twigs.

A.—Body light green; unguis about same length as III; cornicle .12 to .30, longer than hind tarsal II. (p. 179)..................................The Green Spiraea Aphid *(Aphis spiraecola)*

AA.—Body brown; unguis shorter than III; cornicle .10 to .15, about same length as hind tarsal II. (p. 179)..The Brown Spiraea Aphid *(Aphis spiraephila)*

Spruce, Blue *(Picea pungens)*, engelmann *(P. engelmanni)* and Norway *(P. excelsa)*. On bark of twigs.

A.—Cornicle a mere ring; sensoria oval-transverse; hairs inconspicuous; stigma extending to apex of wing; body pale yellow or green, alata with dusky dorsal dashes; cauda slightly produced, bearing one pair of apical hairs. (p. 346)...The Balsam Twig Aphid *(Mindarus abietinus)*

AA.—Cornicle mammiform, bearing hairs; sensoria circular; hairs more or less conspicuous; stigma of fore wing not attaining apex.

B.—Tibial hairs short, not longer than diameter of tibia in aptera.

C.—Body black, with little or no pulverulence; legs dark; tibial hairs blunt, drooping, numerous, .03 to .05, as long as third diameter of hind tibia in aptera, half in alata; rostral IV .23 to .25, shorter than hind tarsal II. (p. 27)..The Black Polished Spruce Aphid *(Cinara coloradensis)*

CC.—Body bluish black, without pulverulence; legs yellow; tibial hairs pointed, semierect, .08 long, slightly longer than diameter of tibia in aptera, 1.5 times in alata; rostral IV .27, about the same length as hind tarsal II. On Engelmann Spruce. (p. 32)...The Yellow-legged Spruce Aphid *(Cinara hottesi)*

BB.—Tibial hairs long, in aptera once but not more than twice diameter of tibia.

C.—Tibial hairs at angle not exceeding 60 degrees; body dark brown with pattern of pulverulence. (p. 38).........The Spotted Spruce Aphid *(Cinara palmerae)*

CC.—Tibial hairs at angle exceeding 60.

D.—Hind tarsal II coequal with III.

E.—Dark brown; without powder; rostral IV .20; hind tarsal II .38 to .49; hind tibia dark. On Norway spruce. (p. 39)...The Dark Brown Spruce Aphid *(Cinara piceicola)*

EE.—Body light cinnamon-brown to tan with two rows of green to black spots; pulverulence only on intersegmental lines; rostral IV .15; hind tarsal II .30 to .35; hind tibia pale. On Engelmann spruce. (p. 29)................The Light Brown Spruce Aphid *(Cinara engelmanniensis)*

DD.—Hind tarsus shorter than III.

E.—Body yellowish with dark brown areas; almost entirely covered with pulverulence; rostral IV .19 to 24, longer than half hind tarsal II. (p. 24)..................................The Powdery Spruce Aphid *(Cinara braggii)*

EE.—Body dark rufous brown, mottled with yellowish; little pulverulence; rostral IV .16, as long as half hind tarsal II. On Engelmann spruce. (p. 50)........The Brown Mottled Spruce Aphid *(Cinara vandykei)*

Squash—see Cucumber

Storksbill—see Alfilaria

Strawberry *(Fragaria sp.)*

A.—Usually on leaves, leaf stems and crown, occasionally on roots. Body dark green, mottled with yellowish; antenna shorter than body; cornicle 2 to 3 times length of hind tarsal II; III with 2 to 4 sensoria in alata; hairs simple; cauda shorter on median line than base of VI; antenna with unguis longer than III; rostral IV+V .13 to .15 long, longer than cauda on median line. (p. 137)..The Strawberry Root Aphid *(Aphis forbesi)*

AA.—On leaves and leaf stems, not on roots. Body light green; antenna longer than body; cornicle 3 to 6 times as long as hind tarsal II; sensoria not fewer than 10 on III of alata; hairs capitate.

B.—Frontal tubercles exceeding vertex but not converging; cornicle never swollen; body immaculate; hairs distinctly capitate.

C.—Hairs conspicuously capitate on vertex and antennal I, II and III, especially in aptera; III .50 to .70; cornicle .30 to .40 in alata, .50 to .60 in aptera. (p. 256)......................The Rose Strawberry Aphid *(Capitophorus fragaefolii)*

CC.—Hairs not conspicuously capitate on antennal II and III; III .28 to .37, cornicle .23 to .30. (p. 263)...*Capitophorus minor*

BB.—Frontal tubercles exceeding vertex and converging; cornicle often slightly swollen; dorsal patch or bands present on abdomen of alata; hairs not distinctly capitate. (p. 340)..The Green Peach Aphid *(Myzus persicae)*

Sugar Beet—see Beet

Sunflower *(Helianthus sp.)*

A.—On roots. Antenna shorter than half body; cornicle absent; media of fore wing simple; III not longer than hind tarsal II; body pale olive-greenish to buff. (p. 367)..The White Aster-root Aphid *(Prociphilus erigeronensis)*

AA.—On leaves and stems. Antenna not shorter than half body; cornicle present; media of fore wing twice-branched; III longer than hind tarsal II.

B.—Antenna shorter than body; frontal tubercles not exceeding vertex.

C.—Body yellowish green, mottled with darker green and darker band just anterior to cornicles in summer forms; fall forms brownish; not powdery; cornicle 2 to 3 times as long as hind tarsal II; sensoria 15 to 32 on III in alata, typically absent on IV and V and also on III in aptera. Rostral IV+V .11, same as base of antennal VI. (p. 141)...The Dogwood Sunflower Aphid *(Aphis helianthi)*

CC.—Body yellow-brown to dark dusky green with dusky markings and with powdery reticulation in aptera; cornicle about same length as hind tarsal II; sensoria in alata 10 to 16 on III, usually present on IV and V as well as on III, IV and V in aptera; rostral IV+V .15. (p. 123)...The Western Aster-root Aphid *(Aphis armoraciae)*

CCC.—Body dark olive-buff with powdery reticulation, especially in aptera; cornicle shorter than hind tarsal II; sensoria in alata 20 to 30 on III, present on IV and V and usually on III and IV in aptera; rostral IV+V .15. (p. 133)..*Aphis debilicornis*

BB.—Antenna at least as long as body; frontal tubercles exceeding vertex.

C.—Cornicle swollen.

D.—Cauda at least twice as long as hind tarsal II; frontal tubercles not converging; dorsal patch absent on alata. (p. 238)........*Amphorophora masoni*

DD.—Cauda shorter than twice length of hind tarsal II; frontal tubercles converging; dorsal patch or bands present on abdomen of alata. (p. 340)..The Green Peach Aphid *(Myzus persicae)*

CC.—Cornicle cylindrical.

D.—Body dark brown; cornicle with reticulated area longer than hind tarsal II; sensoria at least 30 on III of alata, 14 to 27 in aptera. (p. 291) ....The Ambrosia Aphid *(Macrosiphum ambrosiae)*

DD.—Body pale green or pink; cornicle with reticulated area same length as hind tarsal II; sensoria 10 to 18 on III of alata, 2 to 6 in aptera. (p. 324)............................The Potato Aphid *(Macrosiphum solanifolii)*

Tomato *(Lycopersicum esculentum)*. On leaves and stems.

A.—Alata with dark dorsal patch or bands on abdomen; cornicle often swollen, imbricated only, not longer than 1.3 times distance across eyes. (p. 340)..The Green Peach Aphid *(Myzus persicae)*

AA.—Alata immaculate; cornicle never swollen; either reticulated or with cross striae at tip; longer than 1.3 times distance across eyes.

B.—Deeper green about each cornicle base, especially in aptera; cornicle with 2 or 3 cross striae next to distinct flange; cauda not longer than twice length of rostral IV+V, 1.3 to 1.5 times distance across eyes, bearing 3 hairs on each side. (p. 342)..The Foxglove Aphid *(Myzus solani)*

BB.—Not deeper green about cornicle bases; cornicle reticulated at tip equal to length of hind tarsal II; cauda 3 times as long as rostral IV+V, longer than 1.5 times distance across eyes, bearing more than 3 hairs on a side. (p. 324)..The Potato Aphid *(Macrosiphum solanifolii)*

Tulip *(Tulipa sp.)*

A.—On bulbs. Antenna shorter than body; frontal tubercles not exceeding vertex; body pale brownish to whitish; sensoria numerous and tuberculate on III of alata; cornicle .12 to .14, same length as rostral IV+V; cauda .06 long on median line, broader than long, bearing 2 hairs on each side, about same length as half of hind tarsal II. (p. 181)..The Tulip Bulb Aphid *(Aphis tulipae)*

AA.—On leaves and stems. Antenna longer than body; frontal tubercles exceeding vertex; body pale green.

B.—Frontal tubercles diverging; body immaculate in both alata and aptera; cornicle cylindrical, longer than 1.5 times distance across eyes, with reticulation on distal end as far as length of hind tarsal II; cauda tapering, on median line nearly as long as distance across eyes, bearing 4 to 6 hairs on each side. (p. 324)..The Potato Aphid *(Macrosiphum solanifolii)*

BB.—Frontal tubercles converging; alata with dorsal patch or bands on abdomen; cornicle shorter than 1.5 times distance across eyes, without reticulation, usually swollen; cauda tapering, on median line, less than half as long as distance across eyes, bearing 3 hairs on each side. (p. 340)..The Green Peach Aphid *(Myzus persicae)*

Turnip *(Brassica rapa)* and Radish *(Raphanus sp.)*. On leaves.

A.—Body brownish green, aptera with two dorsal rows of dark areas; frontal tubercles not exceeding vertex; antenna not longer than body; cornicle shorter than distance across eyes; sensoria 16 to 22 on III, 2 to 10 on IV, 0 to 2 on V in alata. (p. 220)..The Turnip Aphid *(Rhopalosiphum pseudobrassicae)*

AA.—Body pale yellowish green, aptera immaculate, alata with dark dorsal patch or bands on abdomen; frontal tubercles exceeding vertex, converging; antenna as long or longer than body; cornicle at least as long as distance across eyes; sensoria 10 to 15 on III, 0 on IV and V in alata. (p. 340)..........The Green Peach Aphid *(Myzus persicae)*

(On Radish only)

Body light green with dusky dashes; slightly powdery; frontal tubercles not exceeding vertex; antenna not longer than body; cornicle shorter than distance across eyes and shorter than hind tarsal II, swollen; sensoria 50 on III, absent on IV and V in alata. (p. 194)..The Cabbage Aphid *(Brevicoryne brassicae)*

Walnut *(Juglans sp.)*. On leaves.

A.—Cornicle a mere ring; unguis longer than half base of VI; body pale yellow, often with 4 dusky spots on abdomen. (p. 69)..The American Walnut Aphid *(Monellia caryae)*

AA.—Cornicle truncate, bearing hairs; unguis not longer than half the base of VI.

B.—Hairs prominent, .10 to .15 long on appendages, cornicle and body; anal plate deeply divided; sensoria more than 10 on III of alata; alata with black bands on abdomen, aptera with 4 rows of dark spots; veins of fore wing heavily bordered. (p. 79)..The European Walnut Aphid *(Panaphis juglandis)*

BB.—Hairs inconspicuous, short and sparse; anal plate shallowly indented; sensoria fewer than 10 on III of alata; body immaculate; wings hyaline. (p. 67)............The Walnut Aphid *(Chromaphis juglandicola)*

Wheat—see Grain Crops

Willow *(Salix* sp.*)*. On leaves and bark of twigs and small limbs and on roots.

A.—Frontal tubercles not exceeding vertex; antenna not longer than body.

B.—Antenna shorter than half body; hind tarsal I trapezoidal in lateral aspect; radial sector of fore wing nearly straight; cornicle mammiform; cauda rudimentary, semilunar; unguis shorter than base of VI. On bark of limbs in large colonies. Length 4.5 to 5.5. (p. 55)..........The Giant Willow Aphid *(Lachnus salignus)*

BB.—Antenna not shorter than half body; hind tarsal I triangular in lateral aspect; radial sector of fore wing curved; cornicle not mammiform (may be absent); unguis not shorter than base of VI.

C.—Cornicle lacking. On roots. Yellowish brown to blackish; finely pulverulent; cauda rudimentary, semilunar; unguis 1.5 times length of base; sensoria 13 to 21 on III of alata. (p. 111)............The Willow Root Aphid *(Fullawaya saliciradicis)*

CC.—Cornicle present. On leaves and bark of twigs and limbs.

D.—Cornicle truncate, reticulated on distal half, not longer than base of VI; unguis not shorter than base of VI.

E.—Cauda semilunar.

F.—On bark of twigs. Body dark brown to blackish; fore wing slightly smoky. (p. 98)............*Periphyllus macrostachyae*

FF.—On bark of trunk near roots. Body not blackish; fore wing not smoky. (p. 100)............*Periphyllus salicicorticis*

EE.—Cauda knobbed. On leaves and twigs. Body green, brown or yellow, often aptera with broad black vittae; alata with bands on abdomen. In large colonies. (p. 92)............The Little Black and Green Willow Leaf Aphid *(Chaitophorus viminalis)*

DD.—Cornicle vasiform or cylindrical, longer than base of VI (except minute in *P. braggii)*; unguis distinctly longer than base of VI.

E.—Cauda semilunar; antenna hairy; body yellow-brown to reddish brown.

F.—Cornicle cylindrical, minute, curved medially, shorter than base of VI; body dull yellow to dusky brown; hairy. On roots. (p. 106)............*Pterocomma braggii*

FF.—Cornicle swollen, not curved, longer than base of VI. On bark.

G.—Cornicle swelling from base.

H.—Cornicle broad, hardly longer than twice width, longer than IV, with flange, yellow-ochre; body dark brown, with powder which gives bluish effect. (p. 110)............The Black Willow Aphid *(Pterocomma smithiae)*

HH.—Cornicle much longer than broad, shorter than IV, without flange, bright orange; body dull yellow-brown, with pair of longitudinal rows of black areas; very flocculent. (p. 107)............The Flocculent Willow Aphid *(Pterocomma flocculosa)*

GG.—Cornicle with swelling after proximal third.

H.—Cornicle swollen at middle to twice diameter of base, bright orange, longer than IV; body bluish to greenish black, with powdery areas. III .70 to .75. (p. 109)............*Pterocomma salicis*

HH.—Cornicle swollen slightly on distal third, yellowish, same length as IV; body reddish-brown; slightly powdery on median and intersegmental lines. III. 40 to .50. (p. 105)............The Reddish Brown Willow Bark Aphid *(Pterocomma bicolor)*

EE.—Cauda elongate, tapering; antenna not conspicuously hairy; body pale green or pinkish.

F.—Abdomen with supracaudal process in aptera, median tubercle on terminal segment in alata; dorsum of aptera rugose; sensoria numerous and tuberculate on III of alata.

G.—Cornicle swollen.

H.—Supracaudal process knoblike, much shorter than cauda; unguis 1.5 times as long as base of VI. (p. 197) .... *Cavariella essigi*

HH.—Supracaudal process in aptera triangular, same length as cauda; unguis shorter than 1.5 times length of base of VI. (p. 196) .... *Cavariella aegopodii*

GG.—Cornicle cylindrical. (p. 198) .... *Cavariella theobaldi*

FF.—Without supracaudal process; dorsum of aptera not rugose; sensoria not numerous and tuberculate on III of alata.

G.—Cornicle cylindrical, .50 to .55 long in aptera; .35 to .40 in alata, longer than IV and 3 to 4 times length of hind tarsal II. (p. 172) .... The Green and Pink Willow Aphid *(Aphis saliceti)*

GG.—Cornicle swollen, .09 to .13 long, hardly longer than IV or hind tarsal II. (p. 194) .... *Brevicoryne fraterna*

AA.—Frontal tubercles exceeding vertex; antenna longer than body; cornicle longer than III, reticulated area as long as hind tarsal II; cauda tapering, .35 on median line, 2.5 times length of hind tarsal II; sensoria 5 to 10 on III of alata. (p. 296) .... The California Willow Aphid *(Macrosiphum californicum)*

Wolfberry, Western and Snowberry *(Symphoricarpos* sp.*)*

A.—Cornicle cylindrical; cauda rounded, inconspicuous.

B.—Body sordid brown-green; very pulverulent; frontal tubercles slightly exceeding vertex; cornicle transversely wrinkled, shorter than hind tarsal II or antennal V; sensoria absent on IV and V. On bark at base of stem. (p. 115) .... The Pulverulent Snowberry Aphid *(Amphicercidus pulverulens)*

BB.—Body yellow-green with dark bands; frontal tubercles not exceeding vertex; cornicle imbricated, longer than hind tarsal II, not shorter than V; sensoria present on IV and V in both alata and aptera. On leaves or roots. (p. 144) .... *Aphis incognita*

AA.—Cornicle swollen; cauda elongate, tapering to a point. On leaves.

B.—Brownish green with black bands in alata, powdery cross dashes in aptera; cornicle shorter than IV; sensoria present on V in alata, absent in aptera. (p. 195) .... The Snowberry Aphid *(Brevicoryne symphoricarpi)*

BB.—Pale yellowish to yellowish brown, immaculate; cornicle longer than IV; sensoria absent on V in both alata and aptera. (p. 213) .... *Rhopalosiphum conii*

Yellow Pine—see Pine

Host Plant List

This list includes all host plants recorded in connection with the foregoing descriptions of both the Aphids taken in the region herein treated and genotypes not as yet found here but included in descriptions for the purpose of establishing the concept of the genus.

The determinations of the plants were made with the assistance of various members of the Departments of Botany, Forestry and Horticulture for the past half century, and given a final checking for synonymy by H. D. Harrington, present taxonomist of the Botany Department. Botanical works also used in the preparation of this list not only for scientific names, but more especially for the common names, are as follows:

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Abies concolor (White Fir)
  Cinara curvipes
  Cinara occidentalis
Abies lasiocarpa (Alpine Fir)
  Cinara curvipes
  Cinara lasiocarpae
  Cinara occidentalis
  Mindarus abietinus
Acer sp. (Maple)
  Periphyllus testudo
Acer campestre (Hedge Maple)
  Drepanosiphum platanoides
Acer glabrum (Rocky Mountain Maple)
  Periphyllus americanus
  Periphyllus brevispinosus
Acer grandidentatum (Bigtooth Maple)
  Drepanaphis granovskyi
  Drepanaphis spicata
  Drepanaphis utahensis
  Periphyllus americanus
Acer negundo (Boxelder)
  Drepanosiphum braggii
  Periphyllus negundinis
Acer platanoides (Norway Maple)
  Drepanosiphum platanoides
  Periphyllus lyropictus
Acer pseudoplatanus (Planetree Maple)

  - *Drepanosiphum platanoides*
  - *Periphyllus americanus*
- **Acer saccharinum (Silver Maple)**
  - *Drepanaphis acerifolii*
  - *Periphyllus americanus*
- **Acer saccharum (Sugar Maple)**
  - *Periphyllus americanus*
  - *Periphyllus lyropictus*
- **Achillea** sp. **(Yarrow)**
  - *Pemphigus balsamiferae*
- **Achillea millefolium (Common Yarrow)**
  - *Aphis helichrysi*
  - *Aphis knowltoni*
- **Achillea ptarmica (Sneezewort Yarrow)**
  - *Microsiphum ptarmicae*
- **Aconitum columbianum (Columbia Monkshood)**
  - *Kakimia wahinkae*
- **Actinea** sp.
  - *Macrosiphum euphorbiae*
- **Agrimonia eupatoria (Common Agrimony)**
  - *Macrosiphum agrimoniellum*
- **Agrimonia striata (Roadside Agrimony)**
  - *Macrosiphum solanfolii*
  - *Macrosiphum pseudorosae*
- **Agrimony**—see **Agrimonia**
- **Agropyron** sp. **(Wheat Grass)**
  - *Brachycolus tritici*
  - *Forda olivacea*
  - *Sipha agropyronensis*
  - *Colopha ulmisacculi*
  - *Toxoptera graminum*
- **Alder**—see **Alnus**
- **Alfalfa**—see **Medicago**
- **Alfilaria**—see **Erodium**
- **Alnus** sp.—**Alder**
  - *Euceraphis gillettei*
  - *Oestlundiella flava*
- **Alnus rhombifolia (Sierra Alder)**
  - *Oestlundiella flava*
- **Alnus tenuifolia (Thinleaf Alder)**
  - *Euceraphis gillettei*
  - *Oestlundiella flava*
- **Alopecurus** sp. **(Foxtail)**
  - *Forda olivacea*
- **Althea rosea (Hollyhock)**
  - *Macrosiphum eoessigi*
  - *Myzus persicae*
- **Amaranth, Globe**—see **Gomphrena**
- **Amaranthus** sp. **(Amaranth)**
  - *Aphis gossypii*
  - *Aphis medicaginis*
  - *Macrosiphum solanifolii*
  - *Myzus persicae*
- **Amaranthus retroflexus (Redroot Amaranth)**
  - *Aphis fabae*
  - *Aphis helianthi*
- **Ambrosia artemisifolia (Common Ragweed)**
  - *Aphis helianthi*
  - *Aphis helichrysi*
  - *Capitophorus wasatchii*
- **Ambrosia trifida (Giant Ragweed)**
  - *Aphis armoraciae*
  - *Aphis helianthi*
  - *Macrosiphum ambrosiae*
- **Amelanchier** sp. **(Serviceberry)**
  - *Aphis sensoriata*
- **Amelanchier alnifolia (Common Shad, Juneberry, Saskatoon, Serviceberry)**
  - *Eriosoma americanum*
  - *Macrosiphum macrosiphum*
  - *Prociphilus corrugatans*
- **Anaphalis margaritacea (Common Pearleverlasting)**
  - *Macrosiphum idahoensis*
- **Anethum graveolens (Dill)**
  - *Cavariella aegopodii*
  - *Rhopalosiphum conii*
- **Antelope brush**—see **Purshia**
- **Antirrhinum** sp. **(Snapdragon)**
  - *Myzus persicae*
- **Apium graveolens (Garden Celery)**
  - *Amphorophora sonchi*
  - *Aphis crypta*
  - *Aphis gossypii*
  - *Aphis helichrysi*
  - *Aphis heraclella*
  - *Cavariella aegopodii*
  - *Cavariella theobaldi*
  - *Macrosiphum dirhodum*
  - *Myzus circumflexus*
  - *Myzus persicae*
  - *Rhopalosiphum conii*
- **Apocynum** sp. **(Dogbane)**
  - *Macrosiphum solanifolii*
- **Apple**—see **Malus** sp.
- **Apricot**—see **Prunus armeniaca**
- **Aquilegia** sp. **(Columbine)**
  - *Myzus circumflexus*
- **Aquilegia coerulea (Colorado Columbine)**
  - *Kakimia essigi*
  - *Macrosiphum solanifolii*
- **Aquilegia rubicunda (Pink Columbine)**
  - *Kakimia essigi*
  - *Kakimia utahensis*
- **Aragallus**—see **Oxytropis**
- **Arbor-vitae**—see **Thuja**
- **Arctium** sp. **(Burdock)**
  - *Aphis fabae*
- **Arctostaphylos uva-ursi (Bearberry)**
  - *Amphorophora nervata*
  - *Tamalia coweni*
- **Armoracia lapathifolia (Horseradish)**
  - *Aphis armoraciae*
  - *Macrosiphum solanifolii*
  - *Myzus persicae*
- **Arnica** sp. **(Arnica)**
  - *Amphorophora arnicae*
- **Arrowhead**—see **Sagittaria**
- **Artemisia** sp. **(Wormwood or Sagebrush)**
  - *Capitophorus pycnorhysus*
  - *Geoica utricularia*
  - *Macrosiphum flavila*
  - *Prociphilus erigeronensis*
- **Artemisia aromatica (Linear-leaved wormwood)**
  - *Aphis maidi-radicis*
  - *Aphis menthae-radicis*
  - *Artemisaphis artemisicola*
  - *Capitophorus wasatchii*
  - *Macrosiphum artemisivulgaris*
  - *Macrosiphum glabrum*
  - *Macrosiphum artemisiae*
- **Artemisia borealis (Northern wormwood)**
  - *Macrosiphum frigidae*
- **Artemisia cana (Silver Sagebrush)**
  - *Aphis canae*
  - *Artemisaphis artemisicola*
  - *Macrosiphum jonesii*
- **Artemisia filifolia (Sand Sagebrush)**
  - *Aphis canae*
  - *Aphis filifoliae*
  - *Aphis hermistonii*
  - *Aphis minutissima*
  - *Capitophorus filifoliae*
  - *Epameibaphis utahensis*
  - *Macrosiphum filifoliae*
  - *Macrosiphum jonesii*
- **Artemisia frigida (Fringed Sagebrush)**
  - *Aphis armoraciae*
  - *Aphis maidi-radicis*
  - *Capitophorus pseudoglandulosus*
  - *Epameibaphis frigidae*
  - *Macrosiphum frigidae*
  - *Macrosiphum frigidicola*
  - *Pseudoepameibaphis glauca*
- **Artemisia longifolia (Longleaf Sagebrush)**
  - *Aphis canae*
  - *Artemisaphis artemisicola*
  - *Capitophorus brevinectarius*

- *Capitophorus longinectarius*
- *Capitophorus pullus*
- *Epameibaphis atricornis*
- *Microsiphum acophorum*

Artemisia ludoviciana subsp. **typica**
- *Aphis oregonensis*
- *Capitophorus gnaphalodes*
- *Macrosiphum ludovicianae*

Artemisia ludoviciana (Louisiana Sagebrush)
- *Capitophorus pseudoglandulosus*
- *Macrosiphum ludovicianae*
- *Microsiphum artemisiae*
- *Rhopalosiphum rufomaculatum*

Artemisia tridentata (Big Sagebrush)
- *Aphis canae*
- *Aphis filifoliae*
- *Aphis hermistonii*
- *Aphis infrequens*
- *Aphis oregonensis*
- *Artemisaphis artemisicola*
- *Capitophorus bitrichus*
- *Capitophorus decampus*
- *Capitophorus heterohirsutus*
- *Capitophorus infrequens*
- *Capitophorus longipes*
- *Capitophorus pseudoglandulosus*
- *Capitophorus quadritrichus*
- *Capitophorus rusticatus*
- *Capitophorus spatulavillus*
- *Capitophorus zoomontanus*
- *Epameibaphis atricornis*
- *Epameibaphis frigidae*
- *Epameibaphis utahensis*
- *Flabellomicrosiphum knowltoni*
- *Flabellomicrosiphum tridentatae*
- *Macrosiphum albicornum*
- *Macrosiphum anomellum*
- *Macrosiphum artemisiphilum*
- *Macrosiphum coweni*
- *Macrosiphum flavilum*
- *Macrosiphum jonesii*
- *Macrosiphum zerohypsi*
- *Macrosiphum zerothermum*
- *Microsiphum acophorum*
- *Microsiphum artemisiae*
- *Microsiphum oregonensis*
- *Pseudoepameibaphis essigi*
- *Pseudoepameibaphis tridentatae*
- *Pseudoepameibaphis xenotrichis*
- *Pseudoepameibaphis zavilla*
- *Zyxaphis utahensis*

Artemisia tripartita (Threetip Sagebrush)
- *Macrosiphum jonesii*

Artemisia vulgaris (Common Mug-wort)
- *Capitophorus decampus*
- *Epameibaphis utahensis*
- *Macrosiphum artemisivulgaris*
- *Macrosiphum filifoliae*
- *Macrosiphum jonesii*
- *Macrosiphum ludovicianae*
- *Microsiphum artemisiae*
- *Rhopalosiphum rufomaculatum*

Artichoke, Jerusalem—see Helianthus tuberosus

Ascelpias sp. **(Milkweed)**
- *Aphis gossypii*
- *Aphis helianthi*
- *Aphis lutescens*
- *Macrosiphum solanifolii*

Ascelepias stenophylla
- *Aphis armoraciae*

Asclepias subverticillata (Bedstraw Milkweed)
- *Aphis lutescens*

Ash—see Fraxinus

Ash—Mountain—see Sorbus
Western Mountain—see Pyrus

Asparagus officinalis (Asparagus and Asparagus Fern)
- *Myzus circumflexus*
- *Myzus persicae*

Aspen—see Populus

Aster sp. **(Aster)**
- *Aphis armoraciae*
- *Aphis asterensis*
- *Aphis helichrysi*
- *Aphis maidi-radicis*
- *Aphis menthae-radicis*
- *Atarsos grindeliae*
- *Macrosiphum atripes*
- *Macrosiphum breviscriptum*
- *Macrosiphum erigeronensis*
- *Macrosiphum katonkae*
- *Macrosiphum tenuitarsis*
- *Myzus circumflexus*

Aster ericoides (Heath Aster)
- *Aphis armoraciae*
- *Aphis asterensis*
- *Pemphigus balsamiferae*

Aster laevis (Smooth Aster)
- *Macrosiphum breviscriptum*
- *Macrosiphum katonkae*
- *Macrosiphum tenuitarsis*

Aster laevis var. **geyeri**
- *Macrosiphum breviscriptum*

Aster leucanthemifolius (Daisyleaf Aster)
- *Atarsos grindeliae*
- *Macrosiphum zymozionensis*

Aster novi-belgii (New York Aster)
- *Macrosiphum breviscriptum*

Astragalus sp. **(Milkvetch, Loco** or **Poisonvetch)**
- *Aphis medicaginis*
- *Macrosiphum pisi*

Atriplex sp. **(Saltbush)**
- *Aphis tetrapteralis*

Avena sp. **(Oat)**
- *Aphis maidis*
- *Forda olivacea*
- *Macrosiphum dirhodum*
- *Macrosiphum granarium*
- *Rhopalosiphum rhois*

Avena sativa (Oat)
- *Forda olivacea*
- *Myzus persicae*
- *Rhopalosiphum fitchii*
- *Rhopalosiphum maidis*
- *Rhopalosiphum rhois*
- *Toxoptera graminum*

Balm-of-Gilead—see Populus

Barberry, European—see Berberis

Barley—see Hordeum

Barnyard grass—see Echinochloa

Bean—see Phaseolus and Vicia

Bearberry, red—see Arctostaphylos

Beard-tongue—see Penstemon

Bedbug Currant—see Ribes nigrum

Bedstraw—see Galium

Beebalm—see Monarda

Beggars' ticks—see Bidens

Begonia sp. **(Begonia)**
- *Aphis gossypii*

Berberis vulgaris (European barberry)
- *Rhopalosiphum berberidis*

Berula erecta (Stalky Berula)
- *Cavariella aegopodii*
- *Rhopalosiphum conii*
- *Rhopalosiphum nymphaeae*

Beta vulgaris (Beet)
- *Aphis fabae*
- *Myzus persicae*
- *Pemphigus balsamiferae*

Betula sp. **(Birch)**
- *Calaphis betulella*
- *Calaphis viridipallida*
- *Cepegillettea betulaefoliae*
- *Euceraphis gillettei*
- *Hamamelistes spinosus*
- *Neosymydobius annulatus*

Betula alba (Gray Birch)
- *Calaphis coloradensis*
- *Calaphis granovskyi*
- *Euceraphis betulae*

- **Betula fontinalis (Water Birch)**
  - *Calaphis coloradensis*
  - *Calaphis granovskyi*
  - *Neosymydobius intermedius*
- **Betula papyrifera (Paper Birch)**
  - *Neosymydobius annulatus*
- **Bidens** sp. **(Beggarticks)**
  - *Macrosiphum chrysanthemi*
  - *Pemphigus balsamiferae*
  - *Rhopalosiphum nymphaeae*
- **Bindweed—see Convolvulus**
- **Birch—see Betula**
- **Bitterbrush—see Purshia**
- **Blackberry—see Rubus**
- **Blackcap—see Rubus**
- **Blackeyedsusan—see Rudbeckia**
- **Black Locust—see Robinia**
- **Bluebell—see Mertensia**
- **Bluegrass—see Poa**
- **Boneset, False—see Kuhnia**
- **Boxelder—see Acer**
- **Bramble—see Rubus**
- **Brassica** sp.
  - *Brevicoryne brassicae*
- **Brassica napus (Rape)**
  - *Myzus persicae*
  - *Rhopalosiphum pseudobrassicae*
- **Brassica oleracea (Cabbage)**
  - *Brevicoryne brassicae*
  - *Myzus persicae*
- **Brassica oleracea** var. **botrytis (Cauliflower)**
  - *Brevicoryne brassicae*
  - *Myzus persicae*
- **Brassica rapa (Turnip)**
  - *Rhopalosiphum pseudobrassicae*
- **Brickellia grandiflora (Tasselflower Brickellia)**
  - *Macrosiphum katonkae*
- **Broadbean—see Vicia**
- **Bromus inermis (Awnless Brome-grass)**
  - *Forda olivacea*
- **Bromus tectorum (Smooth Brome)**
  - *Forda olivacea*
- **Brookgrass—see Catabrosa**
- **Brook Snakeweed—see Gutierrezia**
- **Buckthorn—see Rhamnus**
- **Buckthorn, Sea—see Hippophae**
- **Buffaloberry—see Shepherdia**
- **Bulrush—see Scirpus**
- **Burdock—see Arctium**
- **Burnut—see Tribulus**
- **Bursa bursa-pastoris—see Capsella**
- **Burweed—see Xanthium**
- **Buttercup—see Ranunculus**
- **Butterweed—see Senecio**

- **Cabbage—see Brassica**
- **Calendula officinalis (Potmarigold)**
- **Callalily—see Zantedeschia**
- **Canarygrass—see Phalaris**
- **Cantaloupe—see Cucumis**
- **Capsella bursa-pastoris (Shepherdspurse)**
  - *Aphis armoraciae*
  - *Aphis bakeri*
  - *Aphis fabae*
  - *Aphis gossypii*
  - *Aphis helichrysi*
  - *Aphis medicaginis*
  - *Myzus persicae*
  - *Rhopalosiphum pseudobrassicae*
- **Cardoon—see Cynara**
- **Carduus—see Cirsium**
- **Carex** sp. **(Sedge)**
  - *Iziphya flabella*
  - *Myzus timpanogos*
- **Carex nebraskensis (Nebraska sedge)**
  - *Thripsaphis ballii*
  - *Thripsaphis producta*
  - *Thripsaphis verrucosa*
  - *Toxoptera viridi-rubra*
- **Carnation—see Dianthus**
- **Carrot—see Daucus**
- **Carum petroselinum (Parsley)**
  - *Cavariella aegopodii*
- **Carya** sp. **(Hickory)**
  - *Monellia caryae*
- **Castilleja** sp. **(Paintedcup)**
  - *Aphis bakeri*
  - *Aphis chipetae*
  - *Kakimia alpina*
  - *Macrosiphum solanifolii*
- **Castilleja rhexifolia (Splitleaf Paintedcup)**
  - *Aphis kachena*
- **Catabrosa aquatica (Brookgrass)**
  - *Aspidaphis aquatica*
- **Catalpa** sp. **(Catalpa)**
  - *Aphis gossypii*
- **Catnip—see Nepeta**
- **Cattails—see Typha**
- **Cauliflower—see Brassica**
- **Ceanothus velutinus (Snowbrush Ceanothus)**
  - *Aphis ceanothi*
- **Celery—see Apium**
- **Ceratophyllum** sp. **(Hornwort)**
  - *Rhopalosiphum nymphaeae*
- **Cercocarpus montanus (True Mountainmahogany)**
  - *Aphis cercocarpi*
- **Chenopodium album (Lambsquarters Goosefoot)**
  - *Aphis medicaginis*
  - *Hyalopterus atriplicis*
  - *Macrosiphum solanfolii*
  - *Myzus persicae*
  - *Pemphigus balsamiferae (?)*
  - *Pemphigus bursarius*
- **Cherry—see Prunus cerasus**
- **Cherry, sand—see Prunus besseyi**
- **Chickweed—see Stellaria**
  - *Aphis armoraciae*
- **Chokecherry—see Prunus virginiana**
- **Chrysanthemum** sp.
  - *Aphis helichrysi*
  - *Macrosiphum sanborni*
  - *Myzus persicae*
  - *Rhopalosiphum rufomaculatum*
- **Chrysothamnus** sp. **(Rabbit brush)**
  - *Aphis gregalis*
  - *Aphis zonassa*
- **Chrysothamnus greenei (Greenes Rabbitbrush)**
  - *Capitophorus xerozoous*
- **Chrysothamnus nauseosus** subsp. **graveolens (Greenplume Rabbitbrush)**
  - *Aphis chrysothamnicola*
  - *Aphis ornata*
  - *Capitophorus oestlundi*
  - *Capitophorus packi*
  - *Capitophorus wasatchii*
  - *Macrosiphum erigeronensis*
- **Chrysothamnus nauseosus** subsp. **nauseosus (Rubber Rabbitbrush)**
  - *Aphis chrysothamnicola*
  - *Aphis crypta*
  - *Aphis chrysothamni*
  - *Aphis filifoliae*
  - *Aphis gregalis*
  - *Aphis hermistonii*
  - *Aphis nigragregalis*
  - *Aspidaphis adjuvans rowei*
  - *Capitophorus elongatus*
  - *Capitophorus feragaeus*
  - *Capitophorus gregarius*
  - *Capitophorus oestlundi*
  - *Capitophorus sporadicus*
  - *Capitophorus xerozoous*
  - *Durocapillata utahensis*
  - *Macrosiphum aaroni*
  - *Macrosiphum ambrosiae*
- **Chrysothamnus nauseosus** subsp. **typicus**

Capitophorus oestlundi
Capitophorus packi
Capitophorus palmerae
Capitophorus wasatchii
Chrysothamnus parryi
Aphis infrequens
Aphis ornata
Aphis zonassa
Capitophorus elongatus
Capitophorus oestlundi
Capitophorus xerozoous
Chrysothamnus viscidiflorus
Aphis gregalis
Aphis ornata
Capitophorus acanthovillus
Capitophorus elongatus
Capitophorus gregarius
Capitophorus magnautensis
Capitophorus oestlundi
Capitophorus palmerae
Capitophorus pycnorhysus
Durocapillata utahensis
Chrysothamnus viscidiflorus subsp. **stenophyllus**
Capitophorus utensis
Chrysothamnus wyomingensis
Capitophorus xerozoous
Cichorium sp. **(Chicory)**
Aphis armoraciae
Cicuta douglasi (Waterhemlock)
Aphis gossypii
Aphis heraclella
Cavariella aegopodii
Rhopalosiphum conii
Rhopalosiphum nymphaeae
Cineraria sp. **(Cineraria)**
Aphis helichrysi
Macrosiphum solanifolii
Myzus persicae
Myzus solani
Cinquefoil—see Potentilla
Cirsium sp. **(Thistle)**
Aphis cardui
Aphis helianthi
Aphis helichrysi
Aphis pilosicauda
Bipersona ochrocentri
Bipersona torticauda
Capitophorus braggii
Capitophorus carduinus
Myzus persicae
Cirsium arvense (Canada Thistle)
Capitophorus braggii
Cirsium filipendulum
Macrosiphum longirostris
Citrullus vulgaris (Watermelon)
Myzus persicae
Clematis ligusticifolia (Western Virginsbower)
Amphorophora brevitarsis
Cleome serrulata (Bee Spiderflower)
Aphis medicaginis
Clover, red—see Trifolium pratense
Clover, sweet—see Melilotus
Clover, white—see Trifolium repens
Cocklebur—see Xanthium
Collomia—see Gilia
Columbine—see Aquilegia
Cone-flower—see Rudbeckia
Convolvulus sp. **(Bindweed or Glorybind)**
Myzus persicae
Corn—see Zea mays
Cornus stolonifera (Redosier Dogwood)
Anoecia querci
Aphis cornifoliae
Aphis helianthi
Aphis maculatae
Aphis neogillettei
Macrosiphum solanifolii
Corydalis sp. **(Corydalis)**
Kakimia tutigula
Corylus sp. **(Hazelnut or Filbert)**
Myzocallis coryli
Cosmos bipinnatus (Cosmos)
Aphis spiraecola
Cottonwood—see Populus acuminata and sargenti
Cowpea—see Vigna
Cowslip—see Primula
Cowparsnip—see Heracleum
Crataegus sp. **(Hawthorn)**
Amphorophora crataegi
Aphis bakeri
Aphis crataegifoliae
Aphis pomi
Eriosoma crataegi
Prociphilus corrugatans
Rhopalosiphum fitchii
Crazy-weed—see Oxytropis
Cress—see Roripa
Crowfoot—see Ranunculus
Cucumis melo (Muskmelon)
Myzus persicae
Cucumis sativus (Cucumber)
Aphis gossypii
Myzus persicae
Cucurbita sp. **(Gourd, Pumpkin, Squash)**
Aphis gossypii
Macrosiphum solanifolii
Cucurbita maxima (Winter Squash)
Aphis fabae
Aphis gossypii
Myzus persicae
Cupressus guadelupensis (Guadelupe Cypress)
Siphonatrophia cupressi
Currant—see Ribes
Cuscuta sp. **(Dodder)**
Aphis armoraciae
Aphis medicaginis
Cutgrass—see Leersia
Cyclamen sp. **(Cyclamen)**
Myzus circumflexus
Cydonia sp. **(Quince)**
Aphis rosea
Rhopalosiphum fitchii
Cynara cardunculus (Cardoon)
Capitophorus braggii
Cynara scolymus (Artichoke)
Capitophorus braggii
Cynodon dactylon (Dogtoothgrass)
Iziphya maculata
Cyperus virens (Green Flatsedge)
Aphis eriophori
Cypress—see Cupressus
Cystopteris montana (Bladderfern)
Amphorophora ampullata

Dahlia (Dahlia)
Aphis fabae
Aphis helichrysi
Dandelion—see Taraxacum
Daucus carota (Carrot)
Aphis heraclella
Aphis medicaginis
Aphis tulipae
Cavariella aegopodii
Daylily—see Hemerocallis
Pemphigus bursarius
Rhopalosiphum conii
Death Camass—see Zygadenus
Delphinium occidentalis (Duncecap Larkspur)
Aphis rociadae
Kakimia wahinkae
Descurainia sp. **(Tansymustard)**
Aphis armoraciae
Aphis gossypii
Aphis maidi-radicis
Aphis medicaginis
Desert Trumpet—see Eriogonum inflatum
Dianthus caryophyllus (Clove Pink)
Myzus persicae
Digitalis purpurea (Common Foxglove)
Myzus persicae
Dill—see Anethum
Dock—see Rumex
Dodder—see Cuscuta

- **Dogbane**—see **Apocynum**
- **Dogtoothgrass**—see **Cynodon**
- **Dogweed**—see **Dyssodia**
- **Dogwood**—see **Cornus**
- **Dyssodia** sp. **(Dogweed)**
  - *Myzus persicae*
- **Echinochloa crus-galli (Barnyardgrass)**
  - *Aphis setariae*
  - *Forda olivacea*
  - *Geoica utricularia*
  - *Rhopalosiphum maidis*
  - *Rhopalosiphum rhois*
- **Echinocystis lobata (Wild Mockcucumber)**
  - *Aphis gossypii*
  - *Macrosiphum solanifolii*
- **Egg-garden**—see **Solanum melongena**
- **Eichhornia** sp. **(Water-hyacinth)**
  - *Myzus circumflexus*
  - *Rhopalosiphum nymphaeae*
- **Elaeagnus** sp.
  - *Capitophorus hippophaes*
- **Elaeagnus angustifolia (Russianolive)**
  - *Capitophorus braggii*
  - *Capitophorus shepherdiae*
- **Elder**—see **Sambucus**
- **Elm**—see **Ulmus**
- **Elymus (Wildrye)**
  - *Forda formicaria*
  - *Forda olivacea*
  - *Macrosiphum dirhodum*
  - *Macrosiphum granarium*
  - *Rhopalosiphum rhois*
- **Elymus canadensis (Canada Wildrye)**
  - *Rhopalosiphum rhois*
- **Epilobium adenocaulon (Sticky Willowweed)**
  - *Myzus lythri*
- **Epilobium angustifolium (Fireweed)**
  - *Aphis oenotherae*
  - *Aphis oenotherae var. rufa*
  - *Macrosiphum solanifolii*
  - *Macrosiphum tenuitarsis (?)*
  - *Macrosiphum valerianae*
- **Erigeron** sp. **(Erigeron** or **Fleabane)**
  - *Aphis armoraciae*
  - *Aphis helichrysi*
  - *Aphis lugentis*
  - *Aphis urovaneta*
  - *Macrosiphum erigeronensis*
- **Erigeron canadensis (Horseweed Fleabane)**
  - *Aphis armoraciae*
  - *Aphis helichrysi*
- **Erigeron subtrinervis (Threenerve Fleabane)**
  - *Macrosiphum erigeronensis*
- **Eriogonum** sp. **(Eriogonum)**
  - *Amphicercidus maxsoni*
  - *Aphis eriogoni*
  - *Aphis urovaneta*
  - *Braggia echinata*
  - *Macrosiphum martini*
  - *Macrosiphum solanifolii*
- **Eriogonum alatum (Winged Eriogonum)**
  - *Aphis eriogoni*
  - *Aphis medicaginis*
  - *Macrosiphum pseudorosae*
- **Eriogonum arcuatum**
  - *Aphis eriogoni*
- **Eriogonum corymbosum (Corymbed Eriogonum)**
  - *Aphis agathona*
  - *Braggia uncompahgrensis*
- **Eriogonum effusum (Effuse Eriogonum)**
  - *Aphis eriogoni*
- **Eriogonum flavum (Yellow Eriogonum)**
  - *Aphis eriogoni*
- **Eriogonum inflatum (Deserttrumpet Eriogonum)**
  - *Aphis agathona*
  - *Aphis eriogoni*
- **Eriogonum subalpinum (Subalpine Eriogonum)**
  - *Aphis eriogoni*
- **Eriogonum umbellatum (Sulfur Eriogonum)**
  - *Aphis eriogoni*
- **Erodium cicutarium (Alfileria, Filaree)**
  - *Macrosiphum zerozalphum*
- **Euonymus** sp. **(Strawberry Bush)**
  - *Aphis fabae*
- **Eupatorium** sp. **(Joepyeweed)**
  - *Aphis fabae*
  - *Aphis gossypii*
  - *Aphis helichrysi*
- **Euphorbia marginata (Snow-on-the-Mountain** or **White-margined Spurge)**
  - *Macrosiphum solanifolii*
- **Eurotia lanata (Winterfat)**
  - *Macrosiphum frigidicola*
  - *Macrosiphum ludovicianae*

- **Falsehellebore**—see **Veratrum**
- **Fennel**—see **Foeniculum**
- **Filaree**—see **Erodium**
- **Filbert**—see **Corylus**
- **Fir**—see **Abies**
- **Fir, Douglas**—see **Pseudotsuga**
- **Fireweed**—see **Epilobium**
- **Flatsedge**—see **Cyperus**
- **Flax**—see **Linum**
- **Fleabane**—see **Erigeron**
- **Foeniculum** sp. **(Fennel)**
  - *Cavariella capreae*
- **Foxglove**—see **Digitalis**
- **Foxtail**—see **Alopecurus**
- **Fragaria** sp. **(Strawberry)**
  - *Aphis forbesi*
  - *Capitophorus fragaefolii*
  - *Capitophorus minor*
  - *Myzus persicae*
- **Franseria tomentosa (Woollyleaf Bursage)**
  - *Capitophorus wasatchii*
- **Frasera speciosa (Showy Gentian)**
  - *Aphis fraserae*
  - *Macrosiphum martini*
- **Fraxinus americana (White Ash)**
  - *Prociphilus fraxinifoliae*
- **Fraxinus pennsylvania (Red Ash)**
  - *Prociphilus venafuscus*
- **Funkia subcordata (Plantainlily)**
  - *Aphis sambuci*

- **Galium** sp. **(Bedstraw)**
  - *Aphis gossypii*
- **Gaura** sp. **(Gaura)**
  - *Aphis gossypii*
  - *Aphis medicaginis*
  - *Macrosiphum gaurae*
- **Gaura coccinea (Scarlet Gaura)**
  - *Aphis gossypii*
  - *Aphis medicaginis*
- **Gayfeather**—see **Liatris**
- **Geranium** sp. **(Geranium)**
  - *Capitophorus cefsmithi*
  - *Macrosiphum aetheocornum*
- **Geranium richardsoni**
  - *Amphorophora geranii*
  - *Macrosiphum solanifolii*
- **Geranium, tame**—see **Pelargonium**
- **Geum**—see **Sieversia**
- **Gilia aggregata (Skyrocket Gilia)**
  - *Kakimia takala*
- **Gilia linearis (Slenderleaf Gilia)**
  - *Kakimia collomiae*
- **Gladiolus** sp. **(Gladiolus)**
  - *Aphis tulipae*
  - *Macrosiphum solanifolii*
  - *Myzus solani*
- **Globemallow**—see **Sphaeralcea**
- **Glorybind**—see **Convolvulus**

Glyceria fluitans (Water Mannagrass)
Sipha glyceriae
Glycyrrhiza lepidota (American Licorice)
Aphis medicaginis
Goldenrod—see Solidago
Gomphrena sp. (Globeamaranth)
Aphis fabae
Gooseberry—see Ribes
Gourd—see Cucurbita
Grass
Brachycolus holci
Rhopalosiphum splendens
Grass,
Barnyard—see Echinochloa
Brome—see Bromus
Brook—see Catabrosa
Needle—see Stipa
Wheat—see Agropyron
Greasewood—see Sarcobatus
Grindelia squarrosa (Curlycup Gumweed)
Amphorophora grindeliae
Atarsos grindeliae
Macrosiphum erigeronensis
Prociphilus erigeronensis
Ground Cherry—see Physalis
Groundsel—see Senecio
Guelder Rose—see Viburnum
Gumweed—see Grindelia
Gutierrezia sp. (Broom Snakeweed)
Capitophorus acanthovillus
Capitophorus pycnorhysus
Macrosiphum zerogutierreziae
Gutierrezia sarothrae (Broom Snakeweed)
Aphis crypta
Aphis gutierreziae
Capitophorus utensis

Hawthorn—see Crataegus
Hedera helix (English Ivy)
Aphis pseudohederae
Hedge Maple—see Acer
Helenium hoopesi (Orange Sneezeweed)
Macrosiphum martini
Helianthus sp. (Sunflower)
Amphorophora masoni
Aphis maidi-radicis
Macrosiphum ambrosiae
Prociphilus erigeronensis
Helianthus annuus (Common Sunflower)
Aphis debilicornis
Aphis helianthi
Macrosiphum ambrosiae
Macrosiphum solanifolii
Prociphilus erigeronensis
Helianthus petiolaris (Prairie Sunflower)
Aphis helianthi
Helianthus pumilis
Aphis armoraciae
Helianthus tuberosus (Jerusalemartichoke Sunflower)
Aphis debilicornis
Helichrysum sp. (Strawflower)
Aphis fabae
Aphis spiraecola
Macrosiphum solanifolii
Myzus solani
Hemerocallis albida (Daylily)
Aphis sambuci
Heracleum lanatum (Common Cowparsnip)
Aphis heraclella
Cavariella aegopodii
Cavariella essigi
Rhopalosiphum conii
Hibiscus sp. (Rosemallow)
Aphis gossypii
Hickory—see Carya
Hippophae rhamnoides (Sea Buckthorn)
Capitophorus hippophaes
Capitophorus shepherdiae
Capitophorus xanthii
Hollycock—see Althaea
Honeysuckle—see Lonicera
Hop—see Humulus
Hordeum sp. (Barley)
Anoecia graminis
Forda olivacea
Macrosiphum granarium
Rhopalosiphum maidis
Rhopalosiphum rhois
Toxoptera muhlenbergiae
Hordeum vulgare (Barley)
Forda olivacea
Rhopalosiphum maidis
Rhopalosiphum rhois
Toxoptera graminum
Hornwort—see Ceratophyllum
Horsebean—see Vicia
Horsemint—see Monarda
Horseradish—see Armoracia
Humulus lupulus (Common Hop)
Macrosiphum solanifolii
Phorodon humuli
Hyacinth, Wild—see Quamasia

Ipomea rubra coerulea (Heavenlyblue Morningglory)
Myzus persicae
Iresine lindeni
Myzus persicae
Iris sp. (Iris)
Aphis tulipae
Iva sp. (Sumpweed)
Aphis helianthi
Aphis medicaginis
Macrosiphum solanifolii
Pemphigus balsamiferae (?)
Iva xanthifolia (Rag Sumpweed)
Aphis helianthi
Macrosiphum ambrosiae
Ivy—see Hedra

Joepyeweed—see Eupatorium
Juglans sp. (Walnut)
Monellia caryae
Panaphis juglandis
Juglans regia (Persian Walnut) (incorrectly English Walnut)
Chromaphis juglandicola
Monellia caryae
Juncus sp. (Rush)
Geoica utricularia
Juncus lampocarpus
Sipha glyceriae
Juneberry—see Amelanchier
Juniperus communis var. montana (Dwarf Juniper)
Cinara juniperensis
Cinara sibiricae
Juniperus scopulorum (Rocky Mountain Juniper)
Amphorophora morrisoni
Cinara burrilli
Cinara pulverulens
Cinara sabinae
Siphonatrophia gravida
Juniperus utahensis (Utah Juniper)
Cinara pulverulens

Knotweed—see Polygonum
Kochia scoparia (Belvedere Summercypress)
Aphis medicaginis
Kuhnia eupatoroidea (False boneset)
Macrosiphum atripes

Lactuca sp. (Lettuce)
Amphorophora sonchi
Aphis fabae
Aphis medicaginis
Macrosiphum erigeronensis
Macrosiphum escalantii
Macrosiphum solanifolii
Macrosiphum sonchellum
Myzus persicae
Myzus solani
Pemphigus bursarius

Lactuca sativa (Garden Lettuce)
Aphis fabae
Macrosiphum barri
Lactuca spicata (Blue Lettuce)
Myzus persicae
Lambsquarters Goosefoot —see Chenopodium
Lappula sp. (Stickseed)
Aphis helichrysi
Lapsana communis (Nipple-wort)
Pemphigus bursarius
Larkspur—see Delphinium
Lathyrus odoratus (Sweetpea)
Macrosiphum pisi
Leersia oryzoides (Rice Cutgrass)
Colopha ulmicola
Rhopalosiphum nymphaeae
Leonurus cardiaca (Motherwort)
Capitophorus ribis
Myzus solani
Lepidium sp. (Pepperweed)
Aphis medicaginis
Myzus persicae
Lettuce—see Lactuca
Leucocrinum montanum (Common Starlily)
Myzus leucocrini
Liatris punctata (Dotted Gayfeather)
Aphis laciniariae
Capitophorus wasatchii
Licorice—see Glycyrrhiza
Ligusticum sp. (Ligusticum)
Macrosiphum martini
Ligusticum porteri (Porter Ligusticum)
Cavariella aegopodii
Lilium sp. (Lily)
Myzus circumflexus
Myzus solani
Myzus persicae
Lilium candidum (Madonna Lily)
Myzus circumflexus
Myzus persicae
Lily—see Lilium
Lily, Pond—see Nuphar
Linum sp. (Flax)
Macrosiphum granarium
Loco—see Astragalus
Locust—see Robinia
Lonicera sp. (Honeysuckle)
Amphicercidus flocculosus
Rhopalosiphum conii
Lonicera involucrata (Bearberry Honeysuckle)
Amphorophora crystleae
Prociphilus xylostei
Rhopalosiphum grabhami
Lonicera utahensis (Utah Honeysuckle)
Rhopalosiphum grabhami
Lousewort—see Pedicularis
Lupinus sp. (Lupine)
Macrosiphum albifrons
Macrosiphum zionensis
Myzus persicae
Lupinus decumbens (Silvery Lupine)
Aphis lupini
Lycopersicon esculentum (Common Tomato)
Myzus persicae
Myzus solani

Madonna Lily—see Lilium
Maize—see Zea mays
Mallow—see Malva
Mallow, Rose—see Hibiscus
Malus sp. (Apple)
Aphis bakeri
Aphis helichrysi
Aphis medicaginis
Aphis pomi
Aphis rosea
Eriosoma lanigerum
Rhopalosiphum fitchii
Malva neglecta (Malva or Mallow)
Aphis helichrysi
Aphis medicaginis
Macrosiphum solanifolii
Myzus persicae
Mannagrass—see Glyceria
Maple—see Acer
Mathiola sp. (Stock)
Rhopalosiphum pseudobrassicae
Meadowrue—see Thalictrum
Medicago sativa (Alfalfa)
Aphis bakeri
Aphis medicaginis
Macrosiphum creelii
Macrosiphum pisi
Melica bulbosa (Oniongrass)
Forda formicaria
Melilotus sp. (Sweetclover)
Aphis bakeri
Aphis medicaginis
Macrosiphum pisi
Melilotus alba (White Sweetclover)
Aphis medicaginis
Melilotus officinalis (Yellow Sweetclover)
Aphis medicaginis
Melon—see Cucumis
Mentha sp. (Mint)
Aphis menthae-radicis
Phorodon menthae
Mentha canadensis (Canada Mint)
Aphis menthae-radicis
Mentzelia sp. (Mentzelia)
Capitophorus wasatchii
Macrosiphum mentzeliae
Mertensia sp. (Bluebell)
Aphis helichrysi
Macrosiphum mertensiae
Macrosiphum niwanistum
Milkweed—see Asclepias
Milkvetch—see Astragalus
Millet—see Setaria
Mimulus floribundus (Monkeyflower)
Rhopalosiphum nymphaeae
Mint—see Mentha
Mirabilis sp. (Four-o'clock)
Aphis medicaginis
Mirabilis linearis (Narrow-leaved Four-o'clock)
Aphis helianthi
Mirabilis nyctagina (Heart-leaved Four-o'clock)
Aphis helianthi
Mockcucumber, Wild—see Echinocystis
Monarda sp. (Beebalm)
Aphis monardae
Myzus monardae
Monarda fistulosa (Wildbergamot Beebalm)
Myzus monardae
Monkeyflower—see Mimulus
Monkshood—see Aconitum
Morning-glory—see Ipomoea
Motherwort—see Leonurus
Mountainash—see Sorbus
Mountainmahogany—see Cercocarpus
Muskmelon—see Cucumis melo
Mustard—see Descurainia

Nasturtium—see Tropaeolum
Needlegrass—see Stipa
Nepeta cataria (Catnip)
Aphis frangulae
Nettle—see Urtica
Nicotiana tabacum (Common Tobacco)
Myzus persicae
Ninebark—see Physocarpus
Nipplewort—see Lapsana
Nuphar polysepalum (Rocky Mountain Cowlily)
Rhopalosiphum nymphaeae

Oak—see Quercus
Oat—see Avena
Oenothera caespitosa (Tufted Eveningprimrose)
Aphis oenotherae
Oenothera strigosa (Common Evening Primrose)

Anoecia oenotherae
Aphis oenotherae
Aphis oestlundi
Macrosiphum gaurae
Onosmodium occidentale (Western Marbleseed)
Aphis helichrysi
Orache—see Atriplex
Orthocarpos luteus (Yellow Owlclover)
Kakimia alpina
Oxalis sp. **(Wood Sorrel Oxalis)**
Myzus circumflexus
Oxybaphus—see Mirabilis
Oxytropis albiflorus (Rocky Mountain Crazyweed)
Aphis fabae
Aphis medicaginis

Paintbrush, Indian—see Castilleja
Palm
Cerataphis lataniae
Panicum capillare (Witch-grass)
Rhopalosiphum maidis
Panicum crus-galli—see Echinochloa
Papaver sp. **(Poppy)**
Macrosiphum solanifolii
Myzus persicae
Parsley—see Petroselinum
Pastinaca sativa (Garden Parsnip)
Aphis armoraciae
Aphis fabae
Aphis heraclella
Cavariella aegopodii
Rhopalosiphum conii
Pea—see Pisum
Peach—see Prunus persica
Pear—see Pyrus communis
Pearleverlasting—see Anaphalis
Peavine—see Lathyrus
Pedicularis canadensis (Early Pedicularis)
Myzus wakibae
Pedicularis bracteosa (Bracted Pedicularis)
Kakimia alpina
Pelargonium sp. **(Pelargonium)**
Macrosiphum pelargonii
Penstemon sp. **(Penstemon)**
Aphis penststemonicola
Macrosiphum solanifolii
Macrosiphum kiowanepum
Pepperweed—see Lepidium
Periwinkle—see Vinca
Petroselinum crispum latifolium (Parsley)
Phacelia sp. **(Phacelia)**
Aphis helichrysi
Aphis phaceliae
Phalaris arundinacea (Canarygrass)
Sipha glyceriae
Phaseolus sp. **(Bean)**
Aphis gossypii
Aphis medicaginis
Trifidaphis phaseoli
Phaseolus lunatus (Sieva Bean)
Aphis medicaginis
Phaseolus vulgaris (Kidney Bean)
Aphis fabae
Aphis medicaginis
Phleum sp. (Timothy)
Forda formicaria
Phleum alpinum (Alpine Timothy)
Forda formicaria
Phleum pratense (Timothy)
Rhopalosiphum rhois
Phragmites communis (Common Reed)
Hyalopterus arundinis
Physocarpos monogynus (Mountain Ninebark)
Aphis neilliae
Picea engelmanni (Englemann Spruce)
Cinara coloradensis
Cinara engelmanniensis
Cinara hottesi
Cinara palmerae
Cinara vandykei
Picea excelsa (Norway spruce)
Cinara piceicola
Picea pungens (Colorado Spruce)
Cinara braggii
Cinara coloradensis
Cinara fornacula
Cinara palmerae
Mindarus abietinus
Pine—see Pinus
Pink—see Dianthus
Pinus contorta var. **murrayana (Lodgepole Pine)**
Cinara brevispinosa
Cinara medispinosa
Cinara murrayanae
Cinara oregonensis
Essigella californica
Essigella pini
Schizolachnus pini-radiatae
Pinus edulis (Mexican Pinyon Pine)
Cinara atra
Cinara edulis
Cinara terminalis
Essigella hoerneri
Pinus flexilis (Limber Pine)
Cinara apini
Cinara villosa
Cinara flexilis
Essigella hoerneri
Pinus monophylla (Singleleaf Pinyon Pine)
Cinara tanneri
Pinus mughus (Swiss Mountain Pine)
Schizolachnus pineti
Pinus nigra (Austrian Pine)
Cinara pini
Pinus palustris (Longleaf Pine)
Eulachnus rileyi
Pinus pinaster (Cluster Pine)
Schizolachnus pineti
Pinus ponderosa (Ponderosa Pine)
Cinara thatcheri
Pinus ponderosa var. **scopulorum (Rocky Mountain Ponderosa Pine)**
Cinara arizonica
Cinara glabra
Cinara oregonensis
Cinara ponderosae
Cinara pseudoschwarzii
Cinara schwarzii
Cinara solitaria
Essigella californica
Essigella hoerneri
Essigella pini
Eulachnus rileyi
Schizolachnus pini-radiatae
Stomaphis sp.
Pinus slyvestris (Scotch Pine)
Eulachnus agilis
Schizolachnus pineti
Cinara pinea
Cinara pini
Pistacia terebinthus (Terebinth Pistache)
Forda formicaria
Pisum sativum (Garden Pea)
Macrosiphum solanifolii
Macrosiphum pisi
Plantainlily—see Funkia
Plum—see Prunus americana and domestica
Poa sp. **(Bluegrass)**
Forda formicaria
Forda olivacea
Macrosiphum granarium
Myzus persicae
Rhopalosiphum poae

Poa annua (Annual Bluegrass)
- *Sipha glyceriae*

Poa pratensis (Kentucky Bluegrass)
- *Forda formicaria*
- *Forda olivacea*

Poinsettia sp.
- *Pemphigus balsamiferae*

Poisonvetch—see **Astragalus**

Polemonium mellitum speciosum (Cream Polemonium)
- *Kakimia polemonii*

Polygonum sp. **(Knotweed)**
- *Aphis medicaginis*
- *Capitophorus hippophaes*
- *Macrosiphum solanifolii*
- *Rhopalosiphum nymphaeae*

Polygonum aviculare (Prostate Knotweed)
- *Aspidaphis polygoni*

Polgonum punctatum (Dotted Smartweed)
- *Rhopalosiphum nymphaeae*

Poppy—see **Papaver**

Populus sp. **(Poplar)**
- *Chaitophorus populi*
- *Pemphigus bursarius*
- *Pterocomma populifoliae*
- *Pterocomma pseudopopulea*
- *Pterocomma smithiae*

Populus acuminata (Lanceleaf Cottonwood)
- *Aphis maculatae*
- *Chaitophorus populifoliae*
- *Pemphigus populicaulis*
- *Periphyllus populicola*

Populus angustifolia (Narrowleaf Cottonwood)
- *Aphis maculatae*
- *Aphis vorabonnevilla*
- *Chaitophorus populellus*
- *Cornaphis populi*
- *Pemphigus balsamiferae*
- *Pemphigus monophagus*
- *Pemphigus populi-globuli*
- *Pemphigus populi-venae*
- *Periphyllus bruneri*
- *Periphyllus populicola*
- *Pterocomma populifoliae*
- *Thecabius populi-monilis*

Populus candicans (Balm-of-Gilead)
- *Pemphigus populi-globuli*
- *Pemphigus populi-ramulorum*
- *Periphyllus populicola*
- *Pterocomma pseudopopulea*
- *Thecabius populi-conduplifolius*

Populus deltoides (Eastern Cottonwood or **Poplar)**
- *Aphis vorabonnevilla*
- *Thecabius populi-conduplifolius*

Populus nigra var. italica (Lombardy Poplar)
- *Aphis maculatae*
- *Pterocomma pseudopopulea*

Populus occidentalis—see **Populus sargenti**

Populus sargenti (Plains Cottonwood or **Poplar)**
- *Aphis maculatae*
- *Asiphum pseudobyrsa*
- *Chaitophorus populellus*
- *Mordvilkoja vagabunda*
- *Pemphigus junctisensoriatus*
- *Pemphigus nortonii*
- *Pemphigus populicaulis*
- *Pemphigus populi-ramulorum*
- *Pemphigus populi-transversus*
- *Periphyllus populicola*
- *Pterocomma pseudopopulea*
- *Pterocomma smithiae*
- *Thecabius populi-conduplifolius*

Populus tacamahaca (Tacamahac Poplar)
- *Pemphigus balsamiferae*
- *Pemphigus monophagus*
- *Pemphigus populi-ramulorum*
- *Periphyllus bruneri*
- *Thecabius gravicornis*
- *Thecabius populi-monilis*

Populus tremula (European Aspen)
- *Asiphum tremulae*

Populus tremuloides Quaking Aspen)
- *Aphis maculatae*
- *Asiphum rosetti*
- *Asiphum sacculi*
- *Chaitophorus populifoliae*
- *Periphyllus bruneri*
- *Pterocomma beulahensis*
- *Pterocomma populifoliae*

Potato—see **Solanum tuberosum**

Potentilla sp. **(Cinquefoil)**
- *Capitophorus fragaefolii*
- *Kakimia potentillae*
- *Macrosiphum solanifolii*
- *Macrosiphum martini*

Potentilla anserina (Silverweed Cinquefoil)
- *Aphis argentinae-radicis*

Potentilla fructicosa (Bush Cinquefoil)
- *Macrosiphum wasintae*

Prairie Smoke Sieversia—see **Sieversia**

Primrose—see **Primula**

Primrose, Evening—see **Oenothera**

Primula forbesi (Forbes Primrose)
- *Myzus persicae*

Primula parryi (Parry Primrose)
- *Amphorophora pawtincae*

Prunus sp. **(Cherries, Plums, Peaches)**
- *Aphis cardui*
- *Phorodon humuli*

Prunus americana (American Plum)
- *Aphis cardui*
- *Aphis helichrysi*
- *Aphis setariae*
- *Hyalopterus arundinis*
- *Myzus cerasi*
- *Myzus persicae*
- *Phorodon humuli*

Prunus armeniaca (Common Apricot)
- *Aphis zonassa*
- *Hyalopterus arundinis*
- *Myzus persicae*

Prunus besseyi (Bessey Cherry)
- *Myzus persicae*
- *Rhopalosiphum scirpifolii*

Prunus cerasus (Sour Cherry)
- *Myzus cerasi*
- *Myzus persicae*

Prunus domestica (Garden Plum)
- *Aphis helichrysi*
- *Aphis setariae*
- *Hyalopterus arundinis*
- *Myzus persicae*

Prunus japonica (Chinese Bush Cherry)
- *Aphis spiraecola*

Prunus mahaleb (Mahaleb Cherry)
- *Myzus lythri*

Prunus persica (Peach)
- *Aphis persicae-niger*
- *Myzus persicae*

Prunus virginiana (Common Choke Cherry)
- *Aphis cerasifoliae*
- *Asiphonaphis pruni*
- *Myzus persicae*

Pseudotsuga taxifolia (Douglasfir)
- *Cinara osborni*
- *Cinara pseudotaxifoliae*
- *Cinara pseudotsugae*
- *Cinara splendens*
- *Cinara taxifoliae*

Ptiloria—see **Stephanomeria**

Pumpkin—see **Cucurbita**

Purshia tridentata (Bitterbrush or **Antelopebrush)**
- *Macrosiphum purshiae*

- **Pyrus communis (Common Pear)**
  - *Aphis bakeri*
  - *Aphis medicaginis*
  - *Aphis pomi*
  - *Aphis rosea*
- **Pyrus malus—see Malus** sp.
- **Pyrus scopulina—see Sorbus occidentalis**

- **Quamasia hyacinthia (Wild Hyacinth)**
  - *Macrosiphum kiowanepum*
- **Quercus** sp. **(Oaks)**
  - *Anoecia querci*
  - *Hoplochaitophorus quercicola*
  - *Lachnus montanus*
  - *Lachnus roboris*
  - *Myzocallis discolor*
  - *Myzocallis maureri*
  - *Myzocallis punctata*
  - *Stegophylla quercifoliae*
  - *Thelaxes californica*
  - *Thelaxes dryophila*
- **Quercus agrifolia (California Live Oak)**
  - *Stegophylla quercicola*
- **Quercus alba (White Oak)**
  - *Myzocallis alhambra*
  - *Myzocallis punctata*
  - *Neosymydobius albasiphus*
- **Quercus gambelli (Gambel Oak)**
  - *Chaitophorus populifoliae*
  - *Myzocallis alhambra*
  - *Myzocallis maureri*
- **Quercus macrocarpa (Bur Oak)**
  - *Myzocallis alhambra*
  - *Myzocallis maureri*
  - *Myzocallis punctata*
- **Quercus undulata (Wavyleaf Oak)**
  - *Myzocallis alhambra*
  - *Neosymydobius albasiphus*
  - *Stegophylla quercifoliae*
- **Quercus wislizeni (Interior Live Oak)**
  - *Stegophylla quercicola*
- **Quince—see Cydonia**
- **Quincula lobata (Plains Chineselantern)**
  - *Myzus persicae*

- **Radish—see Raphanus**
- **Ragweed—see Ambrosia**
- **Ranunculus** sp. **(Buttercup)**
  - *Rhopalosiphum nymphaeae*
  - *Thecabius populi-conduplifolius*
- **Rape—see Brassica**
- **Raphanus sativus (Garden Radish)**
  - *Brevicoryne brassicae*
  - *Myzus persicae*
  - *Rhopalosiphum pseudobrassicae*
- **Raspberry—see Rubus**
- **Reed—see Phragmites**
- **Rhamnus cathartica (Common Buckthorn)**
  - *Aphis abbreviata*
- **Rheum officinale (Rhubarb)**
  - *Aphis fabae*
- **Rhus glabra (Smooth Sumach)**
  - *Rhopalosiphum rhois*
- **Rhus trilobata (Skunkbush Sumac)**
  - *Rhopalosiphum rhois*
- **Ribes** sp. **(Currant and Gooseberry)**
  - *Aphis ribi-gillettei*
  - *Aphis varians*
  - *Kakimia thomasi*
- **Ribes aureum (Golden Currant)**
  - *Amphorophora nigricornis*
  - *Amphorophora osborni*
  - *Amphorophora ribiella*
  - *Amphorophora sonchi*
  - *Aphis neomexicana*
  - *Aphis ribiensis*
  - *Aphis varians*
  - *Capitophorus ribis*
  - *Kakimia cynosbati*
  - *Kakimia ribe-utahensis*
- **Ribes cereum** or **inebrians (Squaw Currant)**
  - *Kakimia cerei*
  - *Aphis neomexicana*
- **Ribes grossularia (European Gooseberry)**
  - *Kakimia cynosbati*
  - *Kakimia houghtonensis*
- **Ribes inerme (Whitestem Gooseberry)**
  - *Kakimia cynosbati*
- **Ribes nigrum (European Black Currant) and "Bedbug Currant"**
  - *Amphorophora fronki*
  - *Amphorophora sonchi*
- **Ribes rubrum** or **sativum (Common Red Currant)**
  - *Aphis varians*
  - *Capitophorus ribis*
- **Ribes sanguineum (Red-flowering Currant)**
  - *Kakimia cynosbati*
- **Rice Cut-grass—see Leersia**
- **Robinia neomexicana (New Mexico Locust)**
  - *Aphis medicaginis*
  - *Myzocallis robiniae*
- **Robinia pseudoacacia (Black Locust)**
  - *Myzocallis robiniae*
- **Rocky Mountain Yellow Pine—see Pinus ponderosa** var. **scopulorum**
- **Roripa nasturtium-aquaticum (Watercress)**
  - *Myzus langei*
  - *Myzus persicae*
  - *Rhopalosiphum pseudobrassicae*
- **Roripa hispida (Hispid Yellowcress)**
  - *Aphis nasturtii*
  - *Aphis roripae*
- **Roripa obtusa (Obtuse Fieldcress)**
  - *Aphis nasturtii*
- **Roripa sinuata (Spreading Yellowcress)**
  - *Aphis nasturtii*
- **Rosa** sp. **(Rose)**
  - *Amphorophora nervata*
  - *Capitophorus fragaefolii*
  - *Lachnus rosae*
  - *Macrosiphum dirhodum*
  - *Macrosiphum solanifolii*
  - *Macrosiphum nigromaculosum*
  - *Macrosiphum rosae*
  - *Myzus porosus*
- **Rosa fendleri (Woods Rose)**
  - *Lachnus rosae*
- **Rose, Guelder—see Viburnum**
- **Rosemallow—see Hibiscus**
- **Rubus** sp. **(Bramble)**
  - *Macrosiphum solanifolii*
  - *Amphorophora agathonica*
  - *Amphorophora tigwatensa*
  - *Aphis ribicola*
- **Rubus deliciosus (Boulder Raspberry)**
  - *Rhopalosiphum bossekiae*
- **Rubus laciniatus (Cutleaf Blackberry)**
  - *Myzus solani*
- **Rubus occidentalis (Blackcap Raspberry)**
  - *Amphorophora rubi*
  - *Aphis rubicola*
- **Rubus parviflorus (Western Thimbleberry)**
  - *Amphorophora utahensis*
- **Rubus strigosus (Red Raspberry)**
  - *Amphorophora bonnevilla*
  - *Amphorophora rubi*
  - *Amphorophora rubicola*
  - *Aphis rubicola*
  - *Aphis rubifolii*
  - *Myzus solani*

- **Rudbeckia** sp. **(Coneflower)**
  - *Macrosiphum ambrosiae*
  - *Macrosiphum rudbeckiae*
  - *Macrosiphum valerianae*
- **Rudbeckia hirta (Blackeyed Susan)**
  - *Macrosiphum martini*
- **Rudbeckia laciniata (Cutleaf Coneflower)**
  - *Macrosiphum rudbeckiae*
- **Rudbeckia montana**
  - *Macrosiphum cockerelli*
  - *Macrosiphum rudbeckiarum*
- **Rumex** sp. **(Dock)**
  - *Aphis armoraciae*
  - *Aphis fabae*
  - *Aphis gossypii*
  - *Aphis medicaginis*
  - *Aphis rumicis*
  - *Aphis sambuci*
  - *Macrosiphum solanifolii*
  - *Myzus circumflexus*
  - *Myzus persicae*
- **Rumex acetosella (Sheep Sorrel)**
  - *Aphis armoraciae*
- **Rumex crispus (Curly Dock)**
  - *Aphis rumicis*
- **Rumex obtusifolius (Bitter Dock)**
  - *Aphis sambuci*
- **Rush—see Juncus**
- **Russianolive—see Eleagnus angustifolia**
- **Russianthistle—see Salsola**
- **Rye—see Secale**
- **Rye, wild—see Elymus**

- **Sagebrush—see Artemisia**
- **Sagittaria** sp. **(Arrowhead)**
  - *Rhopalosiphum nymphaeae*
- **Salix** sp. **(Willow)**
  - *Aphis saliceti*
  - *Aphis vorabonnevilla*
  - *Brevicoryne fraterna*
  - *Cavariella aegopodii*
  - *Cavariella essigi*
  - *Cavariella theobaldi*
  - *Chaitophorus populi*
  - *Chaitophorus viminalis*
  - *Fullawaya saliciradicis*
  - *Lachnus salignus*
  - *Macrosiphum californicum*
  - *Periphyllus macrostachyae*
  - *Periphyllus salicicorticis*
  - *Periphyllus saliciniger*
  - *Periphyllus utahensis*
  - *Pterocomma bicolor*
  - *Pterocomma braggii*
  - *Pterocomma flocculosa*
  - *Pterocomma pilosa*
  - *Pterocomma salicis*
  - *Pterocomma smithiae*
- **Salix alba (White Willow)**
  - *Lachnus salignus*
- **Salix amygdaloides (Peachleaf Willow)**
  - *Macrosiphum laevigatae*
- **Salix elegantissima (Thurlow Weeping Willow)**
  - *Lachnus salignus*
- **Salix laevigata (Red Willow** or **Polished Willow)**
  - *Fullawaya saliciradicis*
- **Salix lutea (Yellow Willow)**
  - *Aphis sorensoni*
- **Salsify, meadow—see Trapogon**
- **Salsola** sp. **(Russianthistle)**
  - *Aphis medicaginis*
  - *Asiphonaphis utahensis*
  - *Myzus persicae*
- **Sambucus** sp. **(Elder)**
  - *Aphis fabae*
- **Sambucus canadensis (American Elder)**
  - *Macrosiphum macrosiphum*
- **Sambucus nigra (European Elder)**
  - *Aphis sambuci*
- **Sambucus pubens (Scarlet Elder)**
  - *Amphorophora stanleyi*
  - *Aphis fabae*
  - *Aphis sambucifoliae*
- **Sarcobatus vermiculatus (Black Grease-wood)**
  - *Aphis bonnevillensis*
  - *Aphis unaweepiensis*
- **Scirpus** sp. **(Bulrush)**
  - *Rhopalosiphum nymphaeae*
  - *Rhopalosiphum scirpifolii*
  - *Rhopalosiphum splendens*
  - *Saltusaphis elongata*
  - *Saltusaphis scirpa*
  - *Saltusaphis virginica*
- **Scirpus paludosus (Alkali Bulrush)**
  - *Rhopalosiphum scirpifolii*
- **Secale cereale (Rye)**
  - *Macrosiphum granarium*
- **Sedge—see Carex**
- **Senecio** sp. **(Groundsel)**
  - *Aphis armoraciae*
  - *Aphis helichrysi*
  - *Aphis lugentis*
  - *Aphis nyctalis*
  - *Aphis senecio-radicis*
  - *Macrosiphum solanifolii*
- **Senecio atratus (Black Groundsel)**
  - *Aphis lugentis*
- **Senecio spartioides (Broom Groundsel)**
  - *Aphis lugentis*
- **Senecio triangularis (Arrowleaf Groundsel)**
  - *Aphis lugentis*
- **Senecio uintahensis**
  - *Aphis nyctalis*
  - *Macrosiphum pseudorosae*
- **Serviceberry—see Amelanchier**
- **Setaria** sp. **(Bristlegrass** or **Millet)**
  - *Anoecia setariae*
  - *Rhopalosiphum maidis*
  - *Forda olivacea*
- **Setaria viridis (Green Bristlegrass)**
  - *Rhopalosiphum maidis*
- **Shadbush—see Amelanchier**
- **Shepherdia argentea (Silver-berry)**
  - *Capitophorus braggii*
  - *Capitophorus hippophaes*
  - *Capitophorus shepherdiae*
- **Shepherd's Purse—see Capsella**
- **Sieversia ciliata**
  - *Macrosiphum kiowanepum*
- **Smilacina** sp. **(Solomonplume)**
  - *Macrosiphum nivanistum*
  - *Macrosiphum yagasogae*
- **Snakeweed—see Gutierrezia**
- **Snapdragon—see Antirrhinum**
- **Sneezeweed—see Helenium**
- **Sneezewort Yarrow—see Achillea**
- **Snowball—see Viburnum**
- **Snowberry—see Symphoricarpos**
- **Snow-on-the-mountain—see Euphorbia**
- **Soapweed—see Yucca**
- **Solanum melongena (Garden Eggplant)**
  - *Aphis gossypii*
  - *Myzus persicae*
- **Solanum tuberosum (Potato)**
  - *Macrosiphum solanifolii*
  - *Myzus circumflexus*
  - *Myzus persicae*
  - *Myzus solani*
- **Solidago** sp. **(Goldenrod)**
  - *Aphis medicaginis*
  - *Aphis solidaginifoliae*
  - *Macrosiphum ambrosiae (?)*
  - *Macrosiphum atripes*
  - *Pemphigus balsamiferae (?)*
  - *Rhopalosiphum serotinae*
- **Solidago canadensis (Canada Goldenrod)**
  - *Amphorophora goldamaryae*
- **Solidago missouriensis (Missouri Goldenrod)**
  - *Macrosiphum atripes*
- **Solomonplume—see Smilacina**

Sonchus sp. **(Sowthistle)**
Amphorophora sonchi
Macrosiphum solanifolii
Pemphigus bursarius
Sonchus oleraceus (Common Sowthistle)
Amphorophora sonchi
Sorbus sp. **(Mountainash)**
Aphis pomi
Prociphilus corrugatans
Sorghum vulgare (Sorghum)
Rhopalosiphum maidis
Sowthistle—see Sonchus
Sphaeralcea coccinea (Scarlet Globe Mallow)
Myzus persicae
Spiraea sp. **(Spirea)**
Aphis spiraephila
Spiraea vanhoutti (Vanhoutte Spirea)
Aphis spiraecola
Spruce—see Picea
Squash—see Cucurbita
Stachys palustris (Marsh Betony)
Capitophorus ribis
Starlily—see Leucocrinum
Stellaria sp. **(Chickweed)**
Brachycolus stellariae
Stellaria media (Common Chickweed)
Myzus persicae
Stephonomeria pauciflora (Ptiloria) (Wire Lettuce)
Macrosiphum bonitum
Stickseed—see Lappula
Stipa sp. **(Needle grass)**
Rhopalosiphum rhois
Stock—see Mathiola
Strawberry—see Fragaria
Strawflower—see Helichrysum
Sumac—see Rhus trilobata
Sumpweed—see Iva
Sunflower—see Helianthus
Sweetclover—see Melilotus
Sweetpea—see Lathyrus
Symphoricarpos sp. **(Snowberry)**
Amphicercidus flocculosus
Amphicercidus pulverulens
Aphis incognita
Brevicoryne symphoricarpi
Rhopalosiphum conii
Symphoricarpos occidentalis (Western Snowberry)
Aphis incognita
Brevicoryne symphoricarpi
Symphoricarpos rotundifolia (Roundleaf Snowberry)
Brevicoryne symphoricarpi

Tanacetum vulgare (Common Tansy)
Aphis helichrysi
Macrosiphum ludovicianae
Myzus persicae
Tansy—see Tanacetum
Tansymustard—see Descurainia
Taraxacum officinale (Common Dandelion)
Aphis armoraciae
Aphis knowltoni
Aphis medicaginis
Aphis menthae-radicis
Macrosiphum taraxaci
Prociphilus erigeronensis
Trama rara
Tetradymia canescens (Gray Horsebrush)
Aphis tetradymiae
Tetraneuris sp. **(Tetraneuris) —see Actinea**
Thalictrum sp. **(Meadowrue)**
Kakimia purpurascens
Thermopsis montana (Buffalo Pea)
Macrosiphum thermopsaphis
Thimbleberry—see Rubus
Thistle—see Cirsium
Thuja sp. **(Arborvitae)**
Cinara idahoensis
Cinara winonkae
Tilia sp. **(Linden)**
Myzocallis tiliae
Timothy—see Phleum
Tobacco—see Nicotiana
Tomato—see Lycopersicon
Tragopogon pratensis (Meadow Salsify)
Aphis armoraciae
Tribulus terrestris (Puncturevine)
Aphis medicaginis
Trifolium sp. **(Clover)**
Macrosiphum pisi
Trifolium hybridum (Alsike Clover)
Aphis helichrysi
Trifolium pratense (Red Clover)
Aphis bakeri
Aphis helichrysi
Aphis medicaginis
Myzus persicae
Trifolium repens (White Clover)
Aphis helichrysi
Myzus persicae
Triticum sp.
Brachycolis tritici
Macrosiphum granarium
Rhopalosiphum fitchii
Toxoptera graminum
Triticum aestivum (Wheat)
Aphis medicaginis
Aphis setariae
Brachycolus tritici
Forda olivacea
Myzus persicae
Rhopalosiphum fitchii
Rhopalosiphum splendens
Rhopalosiphum subterraneum
Toxoptera graminum
Tropaeolum majus (Common Nasturtium)
Aphis fabae
Myzus persicae
Tulipa sp. **(Tulip)**
Aphis tulipae
Macrosiphum euphorbiae
Myzus persicae
Turnip—see Brassica rapa
Typha latifolia (Common Cat-tail)
Rhopalosiphum enigmae
Rhopalosiphum nymphaeae

Ulmus americana (American Elm)
Eriosoma americanum
Erisoma lanigerum
Erisoma rileyi
Myzocallis ulmifolii
Colopha graminis
Ulmus fulva (Slippery Elm)
Eriosoma crataegi
Gobiashia ulmifusa
Ulmus procera (English Elm)
Colopha ulmisacculi
Urtica gracilis (Slim Nettle)
Amphorophora urticae
Aphis fabae
Aphis helianthi
Aphis helichrysi
Macrosiphum sibiricum

Valeriana sp. **(Valerian)**
Aphis pseudovalerianae
Aphis valerianae
Valeriana edulis (Edible Valerian)
Aphis valerianae
Macrosiphum valerianae
Veratrum californicum (California Falsehellebore)
Aphis coweni
Verbena bipinnatifida (Dakota Verbena)
Aphis gossypii
Myzus persicae
Veronica sp. **(Speedwell)**
Rhopalosiphum nymphaeae
Vetch—see Vicia
Viburnum Opulus (European Cranberrybush)
Aphis fabae

  - *Aphis spiraecola*
  - *Aphis viburniphila*
- **Viburnum opulus** var. **sterile (Snowball** or **Guelder Rose)**
  - *Aphis fabae*
  - *Aphis spiraecola*
  - *Aphis viburnicola*
  - *Aphis viburniphila*
- **Vicia faba (Broadbean** or **Horse Bean)**
  - *Aphis medicaginis*
  - *Myzus persicae*
  - *Trifidaphis phaseoli*
- **Vigna sinensis (Common Cowpea)**
  - *Aphis medicaginis*
- **Vinca** sp. **(Periwinkle)**
  - *Aphis helichrysi*
  - *Myzus circumflexus*
  - *Myzus persicae*
- **Viola** sp. **(Violet)**
  - *Myzus circumflexus*
  - *Myzus persicae*
- **Violet—see Viola**
- **Virginsbower—see Clematis**

- **Walnut—see Juglans**
- **Watercress—see Roripa**
- **Waterhemlock—see Cicuta**
- **Waterhyacinth—see Eichhornia**
- **Waterlily—see Nymphaea**
- **Watermelon—see Citrullus**
- **Wheatgrass—see Agropyron**
- **Wildrye—see Elymus**
- **Willow—see Salix**
- **Willowweed, Sticky—see Epilobium**
- **Winterfat—see Eurotia**
- **Wistaria** sp. **(Wistaria)**
  - *Aphis gossypii*
- **Witchgrass—see Panicum**
- **Wormwood—see Artemisia**

- **Xanthium canadense (Cocklebur)**
  - *Capitophorus xanthii*
- **Xylosteon—see Lonicera**
  - *Rhopalosiphum conii*

- **Yarrow—see Achillea**
- **Yellowcress—see Roripa**
- **Yucca glauca (Yucca** or **Small Soapweed)**
  - *Aphis helianthi*

- **Zantedeschia aethiopica (Callalily)**
  - *Myzus circumflexus*
  - *Myzus persicae*
- **Zea mays (Maize** or **Corn)**
  - *Aphis armoraciae*
  - *Aphis fabae*
  - *Aphis maidi-radicis*
  - *Myzus persicae*
  - *Rhopalosiphum maidis*
- **Zygadenus** sp. **(Deathcamas)**
  - *Macrosiphum kiowanepum*
- **Zygadenus nuttali (Grassy Deathcamas)**
  - *Macrosiphum martini*

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Gazetteer of Localities Mentioned Which Do Not Have Post Offices

IDAHO

Battle Creek—between Dayton and Preston
Beaver Creek—drains into Logan Canon
Emigration Canon—between Preston and Bear Lake, above Mink Creek
Indian Massacre Rocks—west of Pocatello
Look Out Pass—northeast of Preston (10 miles)
Riverdale—north of Preston
Strawberry Creek—branch of Mink Creek northeast from Preston (17 miles)
Thousand Springs—northwest of Twin Falls (25 miles)

UTAH

Allen Canyon—in Hovenweep National Monument
Amalga—northeast of Smithfield (4 miles)
Amazon Mine—in Logan Canon, east of Logan
Ash Creek Canyon—west of Toquerville
Aspen Grove—in Utah Co.
Avon Canyon—southeast of Paradise (6 miles)
Beaver Creek—in Logan Canyon
Beaver Dam—northeast of Collinston
Beaver Mountain—east of Beaver City
Bellmont—south of Fielding (1 mile)
Benjamin—south of Provo (10 miles) or northeast of Payson (6 miles)
Benson—southwest of Smithfield (6 or 7 miles)
Big Cottonwood Canyon—southeast of Salt Lake City
Big Tree Camp—on Mount Timpanogos loop
Birch Canyon—just east of Smithfield
Blacksmith Fork Canyon—east of Hyrum
Blue Bench—north of Duchesne (1 mile)
Brighton Canyon—east of Midvale (17 miles)
Butlerville—east of Midvale
Card Canyon—in Logan Canyon
Cedar—northwest of Woodside (10 miles)
Cedar Canyon—between Cedar City and Cedar Breaks
Cedar Creek—northeast of Morgan (Aspen Association)
Cedar Creek—north of Huntington (Sage-Juniper Association)
Cedar Creek—northeast of Loa (Shadscale-Creosote Bush Association)
Cedar Spring—north of Promontory (5 miles)
City Creek—north of Salt Lake City
Cottonwood Canyon—entering Salt Lake area; southeast of Salt Lake City
Cove Fort—north of Sulfurdale (3 miles)
Cowley Canyon—in Logan Canyon
Curlew Valley—west of Snowville
Currant Creek—near Fruitland
Daniels Canyon—southwest of Heber
Deep Creek Mountains—in west central part of the state near boundary
Dixie National Forest—between Glendale and Hatch
Dry Canyon—southeast of Logan (5 miles)
Dry Lake Bed—near Kingston
Dunbar—northwest of Eureka
Emigration Canyon—southeast of Salt Lake City
Evans—west of Bear River City
Farr West—northwest of Slaterville
Fish Lake—southeast of Richfield (30 miles)
Granite—northwest of Midvale
Hansel's Mountains—southeast to southwest of Snowville
Hardup—north of Park Valley
Harper—north of Brigham
Harrisville—north of Ogden
Holliday—northeast of Murray
Hoop Lake—west southwest of Manilla (20 miles), south of Lonetree, Wyo. (10 miles)
Ideal Beach—just north of Laketown

Indian Canyon—runs southwest from Duchesne; east of Castlegate
Junction Valley—near Thompsons (9 miles)
Kanesville—in Weber County
Lake Point—southwest of Garfield (6 miles)
Lakota—north of Garden City
Lampo—east of Promontory (10 miles)
Little Bear Creek—in Logan Canyon; joins Logan River at Tony Grove
Little Cottonwood Canyon—southeast of Salt Lake City
Locomotive Springs—south of Promontory
Logan Canyon—east of Logan
Madsen—south of Deweyville (3 miles)
Mercury—south of Tooele (15 miles)
Mill Creek—south of Salt Lake City
Monte Cristo—east of Huntsville
Mount Alice—in Fish Lake Mountains east of Monroe (35 miles)
Mount Nebo—northeast of Nephi
Mount Timpanogos—in National Monument northeast of Utah Lake
Mueller's Park—southeast of Bountiful
Navajo Lake—near Cedar Breaks
Nioche—southwest of Snowville
Oak Creek Canyon—east of Delta (20 miles)
Orem—southeast of Pleasant Grove
Orton—north of Panguitch (10 miles). (Listed as Spry on some maps)
Paradise—south of Hyrum
Parley's Canyon—southeast of Salt Lake City
Penrose—southwest of Tremonton
Perry—south of Brigham
Plain City—northwest of Ogden (13 miles)
Provo Bench—northwest of Provo; runs into Pleasant Grove and Orem northwest of Great Salt Lake
Raft River Mountains—near northern boundary of state
Rattle Snake Pass—near Hansel's Mountains
Red Canyon—above Cedar City
River Heights—near Logan
Sardine Canyon—near Wellsville
Skull Valley—west of Iosepa
Slaterville—north of Ogden
Soldiers Summit—north of Colton (7 miles)
Spring Hollow—in Logan Canyon; 7 miles east of the College
Stansbury Island—in Great Salt Lake, southern part
Stockmore Ranger Station—north of Hanna (3 miles)
Strawberry Valley—east of Provo (30 miles) on the way to Vernal
Sunset—southeast of Hooper; south of Ogden (6 miles)
Swan Creek—near Garden City
Settlement Canyon—in Summit County
Showell—southeast of Snowville
South Long Valley Junction—south of Panguitch
Tabby Mountain—west of Tabiona
Taylorsville—suburb of Salt Lake City
Thatcher—west of Tremonton
Timpanogos—east of Lehi (12 miles); 6 miles from Pleasant Grove
Timpie—northwest of Grantsville (15 miles)
Uintah—south of Ogden
Uinta Basin—Duchesne and Uintah Counties south of the Uinta Mountains approximate to the Bad Land Cliffs.
Upper Sigurd Creek—near Sigurd
Weber Canyon—southeast of Ogden
West Jordan—west of Midvale (2 to 3 miles)
West Weber—west of Ogden
Wild Cat Canyon—north of Beaver (10 miles)
Willow Creek—southwest of Escalante
Willow Creek Canyon—north of Price near Castlegate
Wolf Creek Canyon and Pass—summit between Hanna and Woodland

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